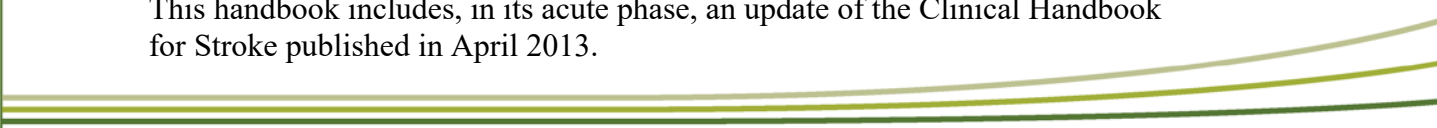


# Quality-Based Procedures: Clinical Handbook for Stroke (Acute and Postacute)

Health Quality Ontario and  
Ministry of Health and Long-Term Care

December 2016  
(Revised, originally published February 2015)

This handbook includes, in its acute phase, an update of the Clinical Handbook for Stroke published in April 2013.



## Suggested Citation

This report should be cited as follows:

Health Quality Ontario; Ministry of Health and Long-Term Care. Quality-based procedures: clinical handbook for stroke (acute and postacute). Toronto: Health Quality Ontario; 2016 December. 132 p. Available from: <http://www.hqontario.ca/evidence/evidence-process/episodes-of-care#community-stroke>.

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## Conflict of Interest Statement

All authors in the Evidence Development and Standards branch at Health Quality Ontario are impartial. There are no competing interests or conflicts of interest to declare.

## About Health Quality Ontario

Health Quality Ontario is an arms-length agency of the Ontario government. It is a partner and leader in transforming Ontario's health care system so that it can deliver a better experience of care, better outcomes for Ontarians, and better value for money.

Health Quality Ontario strives to promote health care that is supported by the best available scientific evidence. Health Quality Ontario works with clinical experts, scientific collaborators, and field evaluation partners to develop and publish research that evaluates the effectiveness and cost-effectiveness of health technologies and services in Ontario.

Based on the research conducted by Health Quality Ontario and its partners, the Ontario Health Technology Advisory Committee (OHTAC)—a standing advisory subcommittee of the Health Quality Ontario Board—makes recommendations about the uptake, diffusion, distribution, or removal of health interventions to Ontario's Ministry of Health and Long-Term Care, clinicians, health system leaders, and policy makers.

Rapid reviews, evidence-based analyses and their corresponding OHTAC recommendations, and other associated reports are published on the Health Quality Ontario website. Visit <http://www.hqontario.ca> for more information.

## About the Quality-Based Procedures Clinical Handbooks

As legislated in Ontario's *Excellent Care for All Act*, Health Quality Ontario's mandate includes the provision of objective, evidence-informed advice about health care funding mechanisms, incentives, and opportunities to improve quality and efficiency in the health care system. As part of its Quality-Based Funding initiative, Health Quality Ontario works with multidisciplinary expert advisory panels (composed of leading clinicians, scientists, and administrators) to develop evidence-based practice recommendations and define episodes of care for selected disease areas or procedures. Health Quality Ontario's recommendations are intended to inform the Ministry of Health and Long-Term Care's Health System Funding Strategy.

For more information on Health Quality Ontario's Quality-Based Funding initiative, visit [www.hqontario.ca](http://www.hqontario.ca).

## Disclaimer

The content in this document has been developed through collaborative efforts between the Ministry of Health and Long-Term Care, the Evidence Development and Standards branch at Health Quality Ontario, and the Expert Advisory Panel on Episode of Care for Stroke. The template for the Quality-Based Procedures Clinical Handbook and all content in the Purpose and Introduction to Quality-Based Procedures sections were provided in standard form by the ministry. All other content was developed by HQO with input from the expert advisory panel. As it is based in part on rapid reviews and expert opinion, this handbook may not reflect all the available scientific research and is not intended as an exhaustive analysis. Health Quality Ontario assumes no responsibility for omissions or incomplete analysis resulting from its reports. In addition, it is possible that other relevant scientific findings may have been reported since completion of the handbook and/or rapid reviews. This report is current to the date of the literature search specified in the Research Methods section of each rapid review. This handbook may be superseded by an updated publication on the same topic. A list of all HQO's Quality-Based Procedures Clinical Handbooks is available at: <http://www.hqontario.ca/evidence/publications-and-ohdac-recommendations/clinical-handbooks>.

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# List of Abbreviations

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<b>AGREE</b>	Appraisal of Guidelines for Research & Evaluation
<b>COPD</b>	Chronic obstructive pulmonary disease
<b>ECFAA</b>	<i>Excellent Care for All Act</i>
<b>ED</b>	Emergency department
<b>EVT</b>	Endovascular Treatment
<b>HBAM</b>	Health-Based Allocation Model
<b>HIG</b>	Health-Based Allocation Model Inpatient Grouper
<b>HQO</b>	Health Quality Ontario
<b>HSFR</b>	Health System Funding Reform
<b>LHIN</b>	Local Health Integration Network
<b>LOS</b>	Length of stay
<b>MT</b>	Mechanical Thrombectomy
<b>OHTAC</b>	Ontario Health Technology Advisory Committee
<b>PBF</b>	Patient-Based Funding
<b>QBP</b>	Quality-Based Procedure
<b>TIA</b>	Transient ischemic attack

# Preface

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This document has been developed through collaborative efforts between the Ministry of Health and Long-Term Care, Health Quality Ontario (HQO), and the HQO Expert Advisory Panels on Episodes of Care for Stroke (the “expert advisory panel”).

The content in the following “Purpose” and “Introduction” sections were provided in standard form by the ministry. All other content was developed by HQO with input from the expert advisory panel.

The content of this Clinical Handbook was developed to conform to the specific deliverables agreed upon by the ministry and HQO.

In the area of quality-based procedures (QBPs), HQO will:

1. Take a provincial leadership role in knowledge translation related to QBP work.
2. Include in their analyses consultations with clinicians and scientists who have knowledge and expertise in identified priority areas, either by convening a reference group or engaging an existing resource of clinicians/scientists.
3. Work with the reference group to:
  - a. Define the population/patient cohorts for analysis and refine inclusion and exclusion criteria for the QBP, using data to review utilization and length of stay trends.
  - b. Develop clinical best practices for defined QBP including transition to the community.
  - c. Seek consensus on a set of evidence-based clinical pathways and standards of care for each episode of care.
4. Submit to the ministry within the deadlines set by the Agreement, a draft report and clinical handbook, including:
  - a. A summary of HQO’s clinical engagement process.
  - b. Guidance on the real-world implementation of the recommended practices contained in the Clinical Handbook, with a focus on implications for multi-disciplinary teams, service capacity planning considerations and new data collection requirements.

The ministry also asked HQO to make recommendations on performance indicators aligned with the recommended episodes of care, in order to inform the ministry’s QBP Integrated Scorecard and to provide guidance on the real-world implementation of the recommended practices contained in the Clinical Handbook. The ministry asked that recommendations focus on implications for multi-disciplinary teams, service capacity planning considerations, and new data collection requirements.

# Key Principles

Discussions between HQO, the expert advisory panels, and the ministry established a set of key principles or “ground rules” to guide this evolving work:

- **The handbook analysis does not involve costing or pricing.** All costing and pricing work related to the QBP funding methodology will be completed by the ministry using a standardized approach, informed by the content produced by HQO. This principle also extends to the deliberations of the expert advisory panels, where discussions are steered away from considering the dollar cost of particular interventions or models of care and instead focused on quality considerations and noncost measures of utilization, such as length of stay (LOS).
- **The scope of this work includes both hospital care and postacute, community care.** Recognizing the importance of this issue, the ministry has communicated that conditions analysed will span all parts of the continuum of care.
- **Recommended practices, supporting evidence, and policy applications will be reviewed to determine if an updated is required, at least every 2 years.** The limited time frame provided for the completion of this work meant that many of the recommended practices in this document could not be assessed with the full rigour and depth of HQO’s established evidence-based analysis process. Recognizing this limitation, HQO reserves the right to revisit the recommended practices and supporting evidence at a later date by conducting a full evidence-based analysis or to update this document with relevant newly published research. In cases where the episode-of-care models are updated, any policy applications informed by the models should also be similarly updated. Consistent with this principle, the ministry has stated that the QBP models will be reviewed at least every 2 years.
- **Recommended practices should reflect the best patient care possible, regardless of cost or barriers to access.** HQO and the expert advisory panels are instructed to focus on defining best practice for an *ideal* episode of care, regardless of cost implications or potential barriers to access. Hence, the resulting cost implications of the recommended episodes of care are not known. However, all expert advisory panels have discussed a number of barriers that will challenge implementation of the recommendations across the province. These include gaps in measurement capabilities for tracking many of the recommended practices, shortages in health human resources, and limitations in community-based care capacity across many parts of the province. Some of these barriers and challenges are briefly addressed in the section “Implementation of Best Practices.” However, with the limited time available to address these issues, the considerations outlined here should only be viewed as an initial starting point towards a comprehensive analysis of these challenges.

Finally, HQO and the expert advisory panels recognize that, given the limitations of their mandate, the ultimate effect of the analysis and advice in this document will depend on how the ministry incorporates it into the QBP policy and funding methodology. This work will be complex, and it will be imperative to ensure that any new funding mechanisms are well-aligned with the recommendations of the expert advisory panels.

In addition to aiding decisions regarding funding methodology, recommended practices can also provide the basis for broader provincial standards of care for stroke patients. These standards could be linked not only to funding mechanisms, but to other health system change levers such as guidelines and care pathways, performance measurement and reporting, program planning, and quality improvement.

# Purpose

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*Provided by the Ministry of Health and Long-Term Care*

This Clinical handbook has been created to serve as a compendium of the evidence-based rationale and clinical consensus driving the development of the policy framework and implementation approach for Stroke (Acute and Postacute).

This document has been prepared for informational purposes only. It does not mandate health care providers to provide services in accordance with the recommendations included herein. The recommendations included in this document are not intended to take the place of the professional skill and judgment of health care providers.

# Introduction to Quality-Based Procedures

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*Provided by the Ministry of Health and Long-Term Care*

The Ministry of Health and Long-Term Care (ministry) established Health System Funding Reform (HSFR) in Ontario in 2012 with a goal to develop and implement a strategic funding system that promotes the delivery of quality health care services across the continuum of care and is driven by evidence and efficiency. HSFR is based on the key principles of quality, sustainability, access, and integration, and aligns with the four core principles of the *Excellent Care for All Act* (ECFAA):

- Care is organized around the person to support their health;
- Quality and its continuous improvement is a critical goal across the health system;
- Quality of care is supported by the best evidence and standards of care; and
- Payment, policy, and planning support quality and efficient use of resources.

Since its inception in April 2012, the ministry has shifted much of Ontario's health care system funding away from the its current global funding allocation (currently representing a large proportion of funding) toward a funding model that is founded on payments for health care based on best clinical evidence-informed practices. HSFR comprises two key components:

- Organizational-level funding, which will be allocated as base funding using the Health-Based Allocation Model (HBAM); and
- Quality-Based Procedure (QBP) funding, which will be allocated for targeted activities based on a “(price x volume) + quality” approach premised on evidence-based practices and clinical and administrative data.

## “Money Follows the Patient”

Prior to the introduction of HSFR, a significant proportion of hospital funding was allocated using a global funding approach, with specific funding for select provincial programs, wait times services, and other targeted activities. However, a global funding approach may not account for complexity in patients, service levels, and costs, and it may reduce incentives to adopt clinical best practices that result in improved patient outcomes in a cost-effective manner. These variations in patient care evident in the global funding approach warranted a move toward a system in which “the money follows the patient.”

Under HSFR, provider funding is based on the types and quantities of patients providers treated, the services they delivered, the quality of care delivered, and patient experiences/outcomes. Specifically, QBPs incentivize health care providers an incentive to become more efficient and effective in their patient management by accepting and adopting clinical best practices that ensure Ontarians get the right care, at the right time and in the right place.

QBPs were initially implemented in the acute care sector, but as implementation evolves, they are being expanded across the continuum of care, including the community home care sector, to address the varying needs of different patient populations.

Internationally, similar models have been implemented since 1983. Ontario is one of the last leading jurisdictions to move down this path, but this positions the province uniquely to learn from international best practices and pitfalls to create a sustainable, efficient, and effective funding model that is best suited for the province and the people of Ontario.

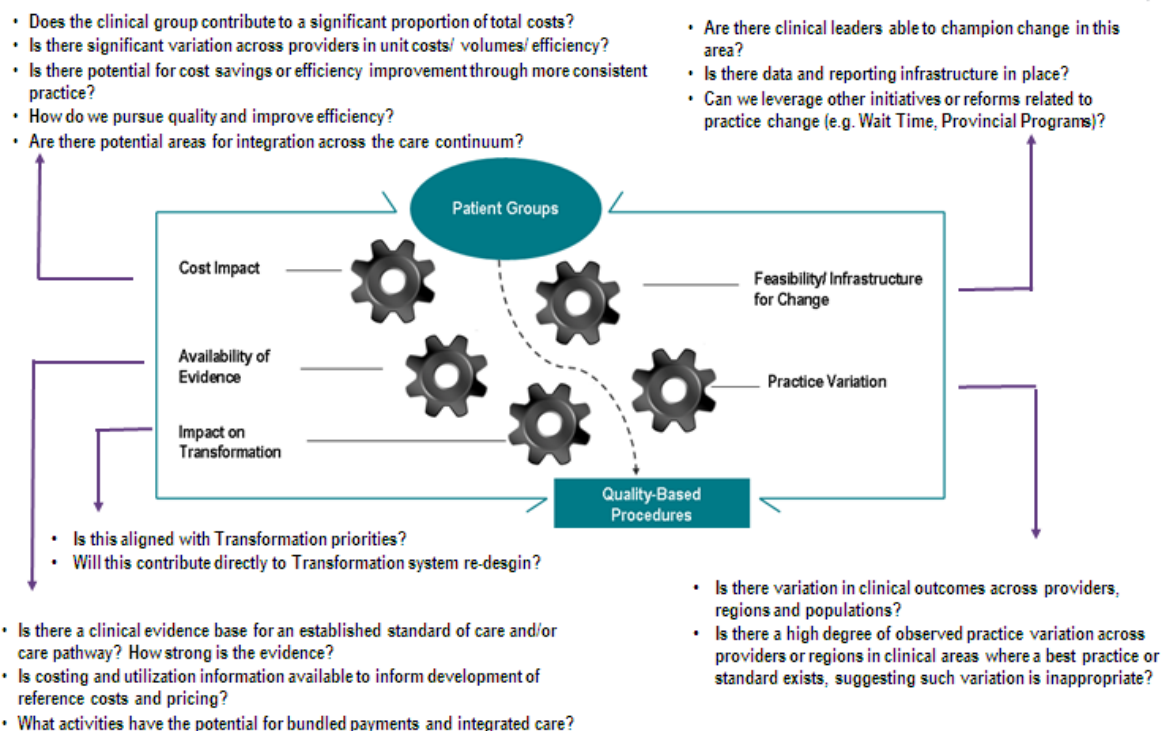
## **What Are Quality-Based Procedures?**

QBP are clusters of patients with clinically related diagnoses or treatments who have been identified using an evidence-based framework as providing an opportunity for process improvements, clinical redesign, improved patient outcomes, enhanced patient experience, and potential health system cost savings.

Initially developed in the acute (hospital) sector, QBPs were defined as “procedures.” However, implementation has evolved since the introduction of QBPs in 2012, and the approach has as well. Currently, the expanded focus is on care provided in other parts of the health care sector, and on a more functional/programmatic/population-based approach. As a result, the definition of QBPs is expanding to include quality-based procedures, programs, and populations.

QBP have been selected using an evidence-based framework. The framework uses data from various sources such as, but not limited to: the Discharge Abstract Database (DAD) and the National Ambulatory Care Reporting System (NACRS), adapted by the ministry for its HBAM repository. The HBAM Inpatient Grouper (HIG) groups inpatients based on the diagnosis or treatment responsible for the majority of their patient stay. Additional data have been used from the Ontario Case Costing Initiative (OCCI) and the Ontario Cost Distribution Methodology (OCDM). Evidence published in literature from Canada and international jurisdictions, as well as in World Health Organization reports, has also assisted with the definition of patient clusters and the assessment of potential opportunities (e.g., reducing variation, improving patient outcomes, sustainability).

The evidence-based framework assesses patients using five perspectives, as presented in Figure 1. This evidence-based framework has identified QBPs with the potential to improve quality of care, standardize care delivery across the province, and show increased cost-efficiency.



**Figure 1: Evidence-Based Framework**

## Practice Variation

Practice variation is the cornerstone of the QBP evidence-based framework. A demonstrated large practice or outcome variance across providers or regions in clinical areas, where a best practice or standard exists, represents a significant opportunity to improve patient outcomes by focusing on the delivery of standardized, evidence-informed practices. A large number of “beyond expected length of stay” and a large standard deviation for length of stay and costs have been flags to such variation.

## Availability of Evidence

A significant amount of research has been conducted and collected, both nationally and internationally, to help develop and guide clinical practice. Working with clinical experts, best practice guidelines and clinical pathways can be developed for QBPs and establish appropriate evidence-informed indicators. These indicators can be used to measure the quality of care and help identify areas for improvement at the provider level, and to monitor and evaluate the impact of QBP implementation.

## Feasibility/Infrastructure for Change

Clinical leaders play an integral role in this process. Their knowledge of the identified patient populations and the care currently provided and/or required for these patients represents an invaluable element in the assessment of much needed clinical delivery and clinical process improvements. Many groups of clinicians have already developed care pathways to create evidence-informed practice. There is now an opportunity for this knowledge to be transferred provincially.

## Cost Impact

The provincial footprint from a financial perspective also impacts the selection of the QBP. This may include QBPs that are high-volume and low-cost, as well as those that are low-volume and high-cost (i.e., specialized procedures that demonstrate an opportunity for improvement).

A selected QBP should have, as a guide, no fewer than 1,000 cases per year in Ontario and represent at least 1% of the provincial direct cost budget. For patient cohorts that fall below these thresholds, the resource requirements to implement a QBP can be restrictive. Even where the patient cohorts represent an opportunity for improvement, it may not be feasible to create a QBP, even if there are some cost efficiencies.

## Impact on Transformation

The *Action Plan for Health Care* was launched in January 2012 and is already making a difference to Ontarians and the Ontario health care system:

- We have bent the cost curve since 2011/2012;
- We are improving the health of Ontarians;
- We are enhancing the experience of Ontarians when they use the health care system; and
- We are working with our health sector partners to improve the quality of health care.

The next phase of transformation will build on and deepen implementation of the action plan. HSFR is a key element of the health system transformation agenda because it ensures sustainability and quality.

Selected QBPs should, where possible, align with the government's transformational priorities. In addition, the impact on the transformation of certain patient populations not previously prioritized by the framework can be included as QBPs. This will ensure that QBPs are wide ranging in their scope (e.g., paediatric patient populations or patients requiring community care). QBPs with a lower cost impact but a higher impact on the provincial health care system may still be a high priority for creation and implementation.

## How Will QBPs Encourage the Delivery of High-Quality, Evidence-Based Care and Innovation in Health Care Delivery?

The QBP methodology is driven by clinical evidence and best practice recommendations from expert advisory panels. Expert advisory panels comprise a cross-sectoral, multi-geographic, and multidisciplinary membership, including representation from patients. Members leverage their clinical experience and knowledge to define patient populations and recommend best practices.

Once defined, best practice recommendations are used to understand the required resource utilization for QBPs and will further assist in the development of evidence-informed prices. The development of evidence-informed pricing for the QBPs is intended to give health care providers an incentive to adopt best practices in their care delivery models, maximize their efficiency and effectiveness, and engage in process improvements and/or clinical redesign to improve patient outcomes.

Best practice development for QBP is intended to promote the standardization of care by reducing inappropriate or unexplained variation and ensuring that patients get the right care at the right place and at the right time. Best practice standards will encourage health service providers to ensure that appropriate resources are focused on the most clinically effective and cost-effective approaches.

QBP create opportunities for health system transformation where evidence-informed prices can be used as a financial lever to incent providers to:

- adopt best practice standards
- re-engineer their clinical processes to improve patient outcomes
- improve coding and costing practices
- develop innovative care delivery models to enhance the experience of patients

An integral part of the enhanced focus on quality patient care is the development of indicators to allow for the evaluation and monitoring of actual practice and support ongoing quality improvement.

In addition, the introduction of additional QBP—such as outpatient and community-based QBP—will further help integrate care across sectors and encourage evidence-based care across the health care continuum.

# Methods

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## Overview of Episode-of-Care Analysis Approach

To produce this work, Health Quality Ontario has developed a novel method known as an *episode-of-care analysis* that draws conceptually and methodologically from several of Health Quality Ontario's core areas of expertise:

- **Evidence Based Analyses:** Recommended practices incorporate components of Health Quality Ontario's evidence-based analysis method and draw from the recommendations of the Ontario Health Technology Advisory Committee (OHTAC).
- **Case-mix grouping and funding methodology:** Cohort and patient group definitions use clinical input to adapt and refine case-mix methods from the Canadian Institute for Health Information (CIHI) and the Ontario Health-Based Allocation Model (HBAM).
- **Clinical practice guidelines and pathways:** Recommended practices synthesize guidance from credible national and international bodies, with attention to the strength of evidence supporting each guideline.
- **Analysis of empirical data:** Expert advisory panel recommendations were supported by descriptive and multivariable analysis of Ontario administrative data (e.g., Discharge Abstract Database and National Ambulatory Care Reporting System) and data from disease-based clinical data sets (e.g., the Ontario Stroke Audit and Enhanced Feedback for Effective Cardiac Treatment databases). Health Quality Ontario works with researchers and Ministry analysts to develop analyses for the expert advisory panel's review.
- **Clinical engagement:** All aspects of this work were guided and informed by leading clinicians, scientists, and administrators with a wealth of knowledge and expertise in the clinical area of focus.
- **Performance indicators:** Health Quality Ontario has been asked to leverage its expertise in performance indicators and public reporting to support the development of measurement frameworks to manage and track actual performance against recommended practices in the episodes of care.

## Phases of Development

This continuum of the acute and postacute stroke episode of care was developed in 3 phases:

Phase 1: developed the acute episode of care (1)

Phase 2: developed the postacute (or 'community') episode of care

Phase 3: updated the acute episode of care and integration with the postacute episode of care for 1 coherent continuum of care

Phase 4: Updated the acute episode of care to include evidence for Endovascular Treatment (EVT) as a best practice

Each phase had their own unique leadership, expert advisory panel membership, and stakeholders engaged. All individuals involved in all phases were aware of the previous work done and built on prior efforts to ensure consistency and flow between the phases. In 2012 the first expert advisory panel was created to develop the acute episode of care. (1) Stemming from the work of this acute episode of care, another expert advisory panel was convened in fall 2013 to develop a postacute

episode of care. In summer 2014 the acute episode of care component was updated and at the same time integrated with the postacute episode of care to create one coherent continuum of care. Finally in summer 2016 the acute care episode was updated to incorporate Endovascular Treatment best practices.

The development of the episode-of-care analysis involves the following key steps:

- 1. Defining the cohort and patient stratification approach**
- 2. Defining the scope of the episode of care**
- 3. Developing the episode-of-care model**
- 4. Identifying recommended practices, including the Rapid Review process**

The following sections describe each of these steps in further detail.

## **Defining the Cohort and Patient Stratification Approach**

At the outset of this project, the Ministry of Health and Long-Term Care provided Health Quality Ontario with a broad description of each assigned clinical population (e.g., “stroke”), and asked Health Quality Ontario to work with the expert advisory panels to define inclusion and exclusion criteria for the cohort they would examine using data from routinely reported provincial administrative databases. Each of these populations might encompass multiple distinct subpopulations (referred to as “patient groups”) with varying clinical characteristics. For example, the congestive heart failure population includes subpopulations with heart failure, myocarditis, and cardiomyopathies. These patient groups have very different levels of severity, different treatments, and different distributions of expected resource use. Consequently, these groups could need different funding policies.

Conceptually, the process employed here for defining cohorts and patient groups shares many similarities with methods used around the world for the development of case-mix methodologies, such as Diagnosis-Related Groups or CIHI’s Case Mix Groups. Case-mix methodologies have been used since the late 1970s to classify patients by similarities in clinical characteristics and in resource use for the purposes of payment, budgeting, and performance measurement (1). Typically, these groups are developed using statistical methods such as classification and regression tree analysis to cluster patients with similar diagnoses, procedures, age, and other variables. After the initial statistical criteria have been established, clinicians are often engaged to ensure that the groups are clinically meaningful. Patient groups are merged, split, and otherwise reconfigured until the grouping algorithm reaches a satisfactory compromise between cost prediction, clinical relevance, and usability. Most modern case-mix methodologies and payment systems also include a final layer of patient complexity factors that modify the resource weight (or price) assigned to each group upward or downward. These can include comorbidity, use of selected interventions, long- or short-stay status, and social factors.

In contrast with these established methods for developing case-mix systems, the approach the ministry asked Health Quality Ontario and the expert advisory panels to undertake is unusual in that patient classification *begins* with the input of clinicians rather than with statistical analysis of resource use. The expert advisory panels were explicitly instructed not to focus on cost considerations, but instead to rely on their clinical knowledge of patient characteristics that are commonly associated with differences in indicated treatments and expected resource use. Expert

advisory panel discussions were also informed by summaries of relevant literature and descriptive tables containing Ontario administrative data.

On the basis of this information, the expert advisory panels recommended a set of inclusion and exclusion criteria to define each disease cohort. Starting with identifying the *International Classification of Diseases*, 10th Revision (Canadian Edition) (ICD-10-CA) diagnosis codes included for the population, the expert advisory panels then excluded diagnoses with treatment protocols that would differ substantially from those of the general population, including pediatric cases and patients with very rare disorders. Next, the expert advisory panels recommended definitions for major patient groups within the cohort. Finally, the expert advisory panels identified patient characteristics that they believe would contribute to additional resource use for patients within each group. This process generated a list of factors ranging from commonly occurring comorbidities to social characteristics, such as housing status.

In completing the process described above, the expert advisory panel encountered some noteworthy challenges:

- **Absence of clinical data elements capturing important patient complexity factors:** the expert advisory panels quickly discovered that several important patient-based factors related to the severity of patients' conditions or to expected resource use are not routinely collected in Ontario hospital administrative data. These include both key clinical measures (such as ratio of forced expiratory volume in 1 second to forced vital capacity for chronic obstructive pulmonary disease [COPD] patients and AlphaFIM®<sup>i</sup> scores for stroke patients) and important social characteristics (such as caregiver status).<sup>ii</sup> For stroke and heart disease, some of these key clinical variables have been collected in the past through the Ontario Stroke Audit and Enhanced Feedback for Effective Cardiac Treatment data sets, respectively. However, these data sets were limited to a group of participating hospitals and at this time are not funded for future data collection.
- **Limited focus on a single disease or procedure grouping within a broader case-mix system:** while the expert advisory panels were asked to recommend inclusion and exclusion criteria for only specified populations, the patient populations assigned to Health Quality Ontario are a small subset of the many patient groups under consideration for Quality-Based Procedures (QBPs). Defining population cohorts introduced some additional complications; after the expert advisory panels had recommended their initial definitions (based largely on diagnosis), the Ministry informed the expert advisory panels that several other patient groups that were planned for future QBP funding efforts overlapped with the cohort definitions.

For example, while nearly all patients discharged from hospital with a “most responsible diagnosis” (MRDx) of COPD receive largely ward-based medical care, a few patients diagnosed with COPD receive much more costly interventions, such as lung transplants or resections. On the basis of this substantially different use of resources, the Ministry’s HBAM algorithm assigns these patients to a group different from the general COPD population.

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<sup>i</sup>The Functional Independence Measure (FIM) is a composite measure consisting of 18 items assessing 6 areas of function. These fall into 2 basic domains; physical (13 items) and cognitive (5 items). Each item is scored on a 7-point Likert scale indicative of the amount of assistance required to perform each item (1 = total assistance, 7 = total independence). A simple summed score of 18–126 is obtained where 18 represents complete dependence / total assistance and 126 represents complete independence.

<sup>ii</sup>For a comprehensive discussion of important data elements for capturing various patient risk factors, see Iezzoni. (3)

Given this methodologic challenge, the Ministry requested that the initial cohorts defined by the expert advisory panels be modified to exclude patients that receive selected major interventions. These patients are likely to be assigned to other QBP patient groups in the future. This document presents both the initial cohort definition defined by the expert advisory panel and the modified definition recommended by the Ministry.

In short, the final cohorts and patient groups described here should be viewed as a compromise Based on the currently available data and the parameters of the ministry's HBAM grouping.

## Defining the Scope of the Episode of Care

Health Quality Ontario's episode-of-care analysis draws on a conceptual theory from the emerging worldwide use of episode-based approaches for performance measurement and payment. Averill et al(2), Hussey et al (3), and Rosen and Borzecki (4) describe the key parameters required for defining an appropriate episode of care:

- **Index event:** The event or time point triggering the start of the episode. Examples of index events include admission for a particular intervention, presentation at the emergency department (ED), or diagnosis of a particular condition.
- **Endpoint:** The event or time point triggering the end of the episode. Examples of endpoints include death, 30 days after hospital discharge, or a "clean period" with no relevant health care service use for a defined window of time.
- **Scope of services included:** Although an "ideal" episode of care might capture all health and social care interventions received by the patient from index event to endpoint, in reality not all these services may be relevant to the objectives of the analysis. Hence, the episode could exclude some types of services such as prescription drugs or services tied to other unrelated conditions.

Ideally, the parameters of an episode of care are defined on the basis of the nature of the disease or health problem studied and the intended applications of the episode (e.g., performance measurement, planning, or payment).

## Developing the Episode-of-Care Pathway Model

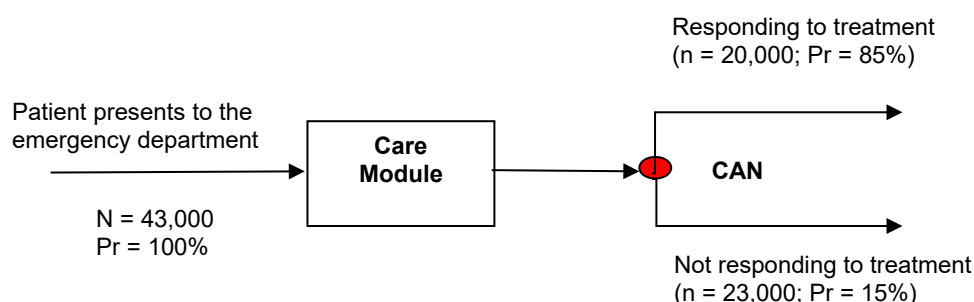
Health Quality Ontario has developed a model that brings together key components of the episode-of-care analysis through an integrated schematic. The model is structured around the parameters defined for the episode of care, including boundaries set by the index event and endpoints, segmentation (or stratification) of patients into the defined patient groups, and relevant services included in the episode. The model describes the pathway of each patient case included in the defined cohort, from initial presentation through segmentation into 1 of the defined patient groups on the basis of their characteristics, and finally through the subsequent components of care that patients receive before reaching discharge or endpoints otherwise defined.

Although the model bears some resemblance to a clinical pathway, it is not intended to be used as a traditional operational pathway for implementation in a particular setting. Rather, the model presents the critical decision points (clinical assessment nodes [CANs]) and phases of treatment (care modules) within the episode of care. Clinical assessment nodes provide patient-specific criteria for whether a particular case proceeds down 1 branch of the pathway or another. Once a particular

branch is determined, a set of recommended practices are clustered together as a care module. Care modules represent the major phases of care that patients receive during a hospital episode, such as treatment in the ED, care on the ward, and discharge planning. The process for identifying the recommended practices within each CAN and care module is described in the next section.

Drawing from the concepts of decision analytic modelling, the episode-of-care model includes crude counts and proportions of cases proceeding down each branch of the pathway model. For this Clinical Handbook, these counts were determined on the basis of utilization data from administrative databases including the Discharge Abstract Database and NACRS. These counts are based on current Ontario practice and are not intended to represent normative or ideal practice. For some clinical populations, evidence-informed targets have been set at certain CANs for the proportions of cases that should ideally proceed down each branch.

Figure 2 provides an example of a care module and CAN.



**Figure 2: Episode of Care Model**

Abbreviations: CAN, clinical assessment node; N, crude counts; Pr, proportions.

## Identifying Recommended Best Practices

### *Consideration of Evidence Sources*

Several evidence sources were considered and presented to the expert advisory panel to develop the episode-of-care model and populate individual modules with best practice recommendations. Preference was given to OHTAC recommendations. Where OHTAC recommendations did not exist, additional evidence sources were sought including guidelines from other evidence-based organizations, Health Quality Ontario's rapid reviews, empirical analysis of Ontario data, and, where necessary and appropriate, expert consensus.

### *OHTAC Recommendations*

The OHTAC recommendations are considered the criterion standard of evidence for several reasons:

- **Consistency:** While many guidance bodies issue disease-specific recommendations, OHTAC provides a common evidence framework across all the clinical areas analyzed in all disease areas.
- **Economic modelling:** OHTAC recommendations are often supported by economic modelling to determine the cost-effectiveness of an intervention, whereas many guidance bodies assess only effectiveness.

- **Decision-Making Framework:** OHTAC recommendations are guided by a decision determinants framework that considers the clinical benefit offered by a health intervention, in addition to value for money; societal and ethical considerations; and economic and organizational feasibility.
- **Context:** In contrast with recommendations and analyses from international bodies, OHTAC recommendations are developed specifically for Ontario. This ensures that the evidence is relevant to the Ontario health system.

### ***Clinical Guidelines***

Published Canadian and international guidelines that encompass the entirety of the stroke episode of care were searched with guidance from HQO medical librarians. Additionally, the expert advisory panels were further consulted to ensure all relevant guidelines were identified.

The methodological rigour and transparency of clinical practice guidelines were evaluated by use of the Appraisal of Guidelines for Research & Evaluation (AGREE) II instrument. (5) AGREE II comprises 23 items organized into 6 quality domains—scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence. (5) The AGREE II domain scores provide information about the relative quality of the guideline. A score of 1 indicates an absence of information or poor reporting; a score of 7 indicates exceptional reporting that meets all criteria. Domain scores are obtained by summing up all of scores of individual items in a domain, and scaling the total as a percentage of the maximum possible score for that domain. Guidelines were selected for inclusion on the basis of individual AGREE scores, with an emphasis on the rigour of development score, which reflects the methods used to assess the quality of evidence supporting the recommendations. The final selection of guidelines included a minimum of 1 contextually relevant guideline (i.e., a Canadian guideline) and 3 to 4 highest quality guidelines, for each phase of the episode of care.

The contextually relevant, or Canadian, guideline served as the baseline and was directly compared with the other included guidelines. The quality of the evidence supporting each recommendation, as assessed and reported by the published guidelines, was identified, and inconsistencies and gaps between recommendations were noted for further evaluation.

### ***Rapid Reviews***

Where there was inconsistency between guidelines, disagreement among expert advisory panel members, or uncertainty about evidence, an HQO evidence review was considered. Recognizing that a full evidence-based analysis would be impractical for all topics, a rapid review of evidence was used to identify the best evidence within the compressed timeframe of developing the entire episode-of-care pathway. Where a rapid review was deemed insufficient or inappropriate to answer the research question, a full evidence-based analysis was considered.

### ***Analysis of Administrative and Clinical Data***

In addition to evidence reviews of the published literature, the expert advisory panels also examined the results of descriptive and multivariable regression analysis using Ontario administrative and clinical data sets. Analyses modeling such patient characteristics as age, diagnoses, and procedures were developed for their association with such outcomes of interest as LOS, resource use, and mortality. Dependent (outcome) and independent variables for analysis were identified by expert advisory panel members on the basis of their clinical experience and their review of summaries of the literature evaluating the association between patient characteristics and a range of outcomes. The

expert advisory panels also provided advice on the analytical methods used, including data sets included and the most functional forms of the variables.

Other analyses reviewed included studies of current utilization patterns, such as average hospital LOS and regional variation across Ontario in admission practices and hospital discharge settings.

### ***Expert Consensus***

The expert advisory panels assessed the best evidence for the Ontario health care system to arrive at the best practice recommendations (see “Recommended Practices”). Where the available evidence was limited or nonexistent, recommendations were made on the basis of consensus agreement by the expert advisory panel members.

# Description of Stroke

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A stroke is a sudden loss of brain function caused by the interruption of blood flow to the brain (ischemic stroke) or the rupture of blood vessels in the brain (hemorrhagic stroke). (1) The interruption of blood flow or the rupture of blood vessels causes brain cells (neurons) in the affected area to die. The longer brain tissue goes without oxygen and nutrients, the greater the risk of permanent damage. Hemorrhagic strokes result from uncontrolled bleeding that can also cause permanent brain damage.

Stroke is the leading cause of adult neurological disability in Canada and the third leading cause of death. (6) Six percent of all deaths in Canada are due to stroke; (7) each year, nearly 14,000 Canadians die as a result of stroke. (8) There are over 50,000 strokes in Canada each year, (7) or 1 stroke every 10 minutes. After people reach the age of 55 years, their risk of stroke doubles every 10 years. (9) A stroke survivor has a 20% chance of having another stroke within 2 years. (9) About 300,000 Canadians live with the effects of stroke. (10)

Stroke costs the Canadian economy \$3.6 billion a year in physician services, hospital costs, lost wages, and decreased productivity. Canadians spend a total of 3 million days in hospital because of stroke. (10)

Of every 100 people who have a stroke: (7)

- 15 die
- 10 recover completely
- 25 recover with a minor impairment or disability
- 40 are left with a moderate to severe impairment
- 10 are so severely disabled they require long-term care

For every 1-minute delay in treating a stroke, the average patient loses 1.9 million brain cells, 13.8 billion synapses, and 12 km of axonal fibres. For each hour without treatment, the brain loses as many neurons as it does in almost 3.6 years of normal aging. (11)

There has been a decline in hospitalization rates for acute stroke over the past 10 years, but because of Canada's aging population and the related growing prevalence of risk factors, the absolute number of strokes is expected to increase over the next 20 years. (10)

Given the current trends related to aging, the high costs of diagnosis and treatment/rehabilitation, and the increasing burden of disease, Ontario must develop an up-to-date, evidence-based, continuum-of-care pathway to guide best practices for both the acute and the postacute settings. By ensuring safe transfers and providing best practice recommendations at all points along the continuum of care, we can help patients further improve their functional outcomes.

## Types of Patients

We describe 2 types of patients in this handbook: patients with a transient ischemic attack (TIA) or minor (nondisabling) stroke, and patients with disabling stroke. Each group has different needs and

treatment protocols. We have divided the recommended practices into 2 sections based on patient type.

### **Patients With Transient Ischemic Attack or Minor (Nondisabling) Stroke**

A TIA is a brief episode of neurologic dysfunction resulting from focal temporary interruption of blood flow to the brain that is not associated with brain cell death. (12) The symptoms and causes of TIA are similar to those of an ischemic stroke, but they disappear in a few minutes or hours. Many people have a TIA without knowing it. A TIA is an important warning that indicates an increased risk for full-blown stroke. (13) Some patients may be classified as having a minor (nondisabling) stroke if their clinical symptoms are similar to TIA but imaging has not yet confirmed the cause.

Each year, about 15,000 people in Canada experience a TIA; many more go unreported. (14) People who have had a TIA are 5 times more likely to have a stroke over the next 2 years than the general population. (9)

### **Patients With Stroke**

#### ***Ischemic Stroke***

About 80% of strokes are *ischemic*, (7) a type of stroke caused by the interruption of blood flow to a part of the brain. Ischemic strokes are either thrombotic or embolic. The primary causes of ischemic stroke are:

- atherosclerotic plaque (cholesterol, fatty materials, calcium, and scar tissue) in the major arteries supplying the brain; a piece of plaque breaks off and embolizes, blocking a distal artery
- embolic stroke from a blood clot forming in the heart or in the arteries that travel into the brain
- thrombotic strokes, where a small artery within the brain is blocked

There are other less common causes of ischemic stroke as well.

#### ***Intracerebral Hemorrhagic Stroke***

*Intracerebral hemorrhage stroke* occurs when an artery deep in the brain ruptures spontaneously. High blood pressure is a major risk factor for this type of stroke.

## **Ontario Stroke Statistics**

- Stroke is the third leading cause of death in Ontario; nearly 6,000 Ontarians die from stroke each year. (15)
- There are approximately 20,300 stroke/TIA visits to Ontario EDs each year. (15)
- There are approximately 16,200 inpatient admissions each year for stroke: 69% for ischemic stroke, 16% for TIAs, and 15% for hemorrhagic stroke. (15)
- 2014/2015, 55% of stroke/TIA patients were discharged home from hospital, 25% to rehabilitation, and 5% to long-term care (15)
- There are approximately 170,000 people in Ontario living with the effects of stroke (16)
- Stroke costs the Ontario economy almost \$1.1 billion annually. (16)

# Recommended Stroke Cohort Definition and Patient Grouping Approach

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## Acute Care

Consistent with the 2013 edition of *Quality-Based Procedures: Clinical Handbook for Stroke*, (1) we recommended that the stroke definition be adapted from the age and diagnostic code criteria included in the Canadian Stroke Strategy Case Definitions 2010 (17) and the Ontario Stroke Network's stroke cohort definition. (15)

## Care Settings

The cohort definitions recommended in this updated handbook for the TIA/stroke continuum of care now span the ED, acute inpatient care, inpatient rehabilitation, and outpatient or rapid access clinics. However, any province-wide policy applications of this cohort definition—including funding- and performance-related efforts—must rely largely on provincial administrative data sets. At present, routinely reported administrative data sets in Ontario that allow for the accurate identification of stroke patients are largely limited to hospital-based settings, but outpatient- and community-based providers are also crucial to a high-quality continuum of stroke care. The expert advisory panel recommended that the Ministry of Health and Long-Term Care implement policies for standardized data collection in community-based settings, beginning with outpatient rehabilitation clinics and outpatient rapid access clinics for TIA and minor stroke.

## Age Range

The cohort includes patients aged 18 years and older. The pediatric stroke population is heterogeneous and significantly different from the adult stroke population; a different mix of experts would be required on the expert advisory panel to address the issues related to pediatric stroke. In addition, the number of pediatric strokes is very small relative to the overall stroke population, and pediatric stroke patients tend to be treated in specialized children's hospitals. The pediatric stroke population should be considered for future work.

## Stroke Diagnosis Codes and Types

### *Emergency Department and Acute Inpatient*

For stroke-related ED visits and acute inpatient stays, cohort cases were identified by the presence any of the diagnosis codes in Table 1, recorded as either the most responsible diagnosis in the acute inpatient setting or the main problem in the ED setting. Based on these diagnosis codes, the stroke cohort can be divided into 4 subgroups from the acute care perspective (Table 1). Strokes occurring as postadmission complications (type 2 diagnosis) were excluded from this cohort definition. Subarachnoid hemorrhages are excluded as they are part of a surgical cohort requiring a specific group of neurosurgical experts and unique best practice recommendations.

### *Endovascular Treatment (EVT)*

Patients with an ischemic stroke diagnostic code (I63 (excluding I63.6)) (or possibly unable to determine stroke type, I64) may be eligible for EVT. To identify patients that undergo EVT, the following diagnostic codes and CCI codes should be used.

Procedures	CCI Code Title Description	CCI Code (v2015)
Cerebral Endovascular Thrombectomy (Clot Retrieval/Extraction)	Extraction, <b>carotid artery</b> using percutaneous transluminal approach. Includes mechanical thrombectomy	1.JE.57-GQ
	Extraction, <b>intracranial vessels</b> using percutaneous transluminal approach and device NEC. Includes mechanical thrombectomy	1.JW.57.GP-GX
	Extraction, <b>other vessels of head, neck and spine</b> NEC, using percutaneous transluminal approach and device NEC	1.JX.57.GP-GX

CCI coding rules indicate when cerebral endovascular dilation is performed with a cerebral endovascular thrombectomy, only a code for the thrombectomy is assigned.

The sensitivity and specificity of the coding within administrative data has not been determined. The data quality of this intervention will need to be monitored and education is needed for clinicians, to improve clinical documentation and for coders, to identify accurate source information

**Table 1: ED and Acute Inpatient Stroke Types**

Stroke Patient Subgroup	ICD-10-CA Code
Transient ischemic attack	G45 (excluding G45.4)
Intracerebral hemorrhage	I61
Ischemic stroke	I63 (excluding I63.6), H34.1
Unable to determine stroke type (not specified as hemorrhagic or ischemic)	I64 <sup>1</sup>

Abbreviations: ED, emergency department; ICD-10-CA, International Classification of Diseases, 10th revision (Canadian edition).

**1. The prevalence of I64 has been dramatically declining and for analyses these cases included ischemic stroke patients.**

Patient Group	Patient Characteristics/Triage Criteria	Recommended Care Pathway
1. Possible TIA: <b>stable</b>	<p>Stable/lower-risk patients presenting to hospital with possible TIA and <b>without higher-risk features</b> consistent with the hemispheric ischemic event</p> <p><b>Higher-risk features</b> include the following:</p> <ul style="list-style-type: none"> <li>• sudden hemiparesis</li> <li>• speech difficulties</li> <li>• monocular vision loss</li> <li>• patients presenting within a short time of symptom onset (especially within 48 hours)</li> <li>• patients with known high-risk conditions associated with stroke, including atrial fibrillation (especially if inadequately anticoagulated) or known carotid artery atherosclerosis with &gt; 50% stenosis on the side consistent with the hemispheric event</li> </ul>	Brain CT scan and initiation of antiplatelet therapy (provided this is not contraindicated) as soon as possible and no later than 24 hours after initial presentation, followed by referral to an outpatient clinic with stroke-prevention services for comprehensive evaluation and management within 1 month of symptom onset

Patient Group	Patient Characteristics/Triage Criteria	Recommended Care Pathway
	patients with very mild persistent symptoms or no residual symptoms but a small asymptomatic infarct on imaging	
2. Possible TIA or minor (nondisabling) stroke: <b>stable/higher risk</b>	Patients presenting to hospital with 1 or more of the higher-risk features described in group 1	If urgent access is available to specialized ambulatory TIA/minor (nondisabling) stroke services, refer patient there If urgent access is not available, consider acute inpatient admission
3. Possible TIA or minor (nondisabling) stroke: <b>unstable/higher risk</b>	Unstable/high-risk patients presenting to hospital with the <b>higher-risk features</b> described in group 1 and with > 1 possible TIA in the previous 2 weeks and/or more significant stroke symptoms (including but not limited to weakness causing possible swallowing difficulty or symptoms causing difficulty with walking safely)	Admit to acute inpatient care <b>FOLLOWED BY</b> Discharge home with community-based supports and stroke-prevention clinic services, where appropriate

### ***Inpatient Rehabilitation***

For inpatient rehabilitation episodes, stroke cohort patients were identified using 1 of 7 stroke rehabilitation patient groups (Table 2). As the table indicates, patients assigned to rehabilitation patient group 1160 generally have milder functional impairment that can be more appropriately treated with outpatient rehabilitation, where available.

**Table 2: Inpatient Rehabilitation Stroke Types**

Stroke RPG
<ul style="list-style-type: none"> <li>Rehabilitation Group 11 – Stroke – RPG 1100 (most severe functional impairment)</li> <li>Rehabilitation Group 11 – Stroke – RPG 1110</li> <li>Rehabilitation Group 11 – Stroke – RPG 1120</li> <li>Rehabilitation Group 11 – Stroke – RPG 1130</li> <li>Rehabilitation Group 11 – Stroke – RPG 1140</li> <li>Rehabilitation Group 11 – Stroke – RPG 1150</li> <li>Rehabilitation Group 11 – Stroke – RPG 1160 (mildest functional impairment; where possible, these patients should receive outpatient or community-based rehabilitation instead of inpatient rehabilitation)</li> </ul>

Abbreviation: RPG, rehabilitation patient group.

### ***Outpatient Clinics***

At present, no standardized data are reported in Ontario on stroke patients in outpatient clinic settings. We recommend that the Ministry of Health and Long-Term Care institute provincial policies for data collection on visits by TIA/stroke (or suspected TIA/stroke) patients to outpatient rehabilitation clinics.

### ***“Query”-Prefix Cases***

In the 2013 clinical handbook for stroke, (1) it was recommended that cases coded with a “Query” (or “Q”) prefix be excluded from the cohort, as they may be “stroke mimics” or other cases where the diagnosis of stroke is in doubt. With the revised cohort definition, the expert advisory panel recommended that “Q”-prefix stroke cases be included, but that the prevalence of these cases be monitored over time to improve diagnostic protocols and decrease their proportion of the total cohort.

### ***Intervention-Based Exclusions***

Based on a request from the Ministry of Health and Long-Term Care, the cohort was further modified to exclude cases that fit the criteria in Table 1, but were assigned to an intervention-based HIG cell using the current HIG methodology (i.e., major clinical categories—partition variable is not “I”). The ministry recommended that these cases be excluded because of overlap with other HIGs based on surgical interventions. In the HIG methodology, cases are assigned to a surgical HIG (e.g., open carotid endarterectomy) instead of one of the major stroke HIGs (Table 1). It is still expected these patients receive the evidence-based care outlined in this handbook. The exclusion of cases assigned on the intervention partition does not apply to stroke patients that receive endovascular treatment.

## **Postacute Care**

Developing criteria to stratify the postacute episode of care for stroke was more complex than it was for acute care, for 2 reasons. First, stroke etiology (e.g., ischemic versus hemorrhagic) is less consequential for the postacute clinical trajectory and expected utilization patterns; a patient’s overall level of functional impairment and other characteristics such as age and home supports are more important. Second, the characteristics guiding the triage of stroke patients to their appropriate postacute care pathway may not be fully assessed until several days into a patient’s acute inpatient episode; for example, the Alpha Functional Independence Measure (AlphaFIM) should be used as the standard assessment tool and completed on or by day 3 after admission (target day 3, admission day is day 1) to hospital

Table 3 divides the stroke cohort into 3 subgroups, each possessing distinct sets of triage criteria made up of patients’ clinical symptoms, indications, and demographic and social characteristics. These criteria were developed by the expert advisory panel and provide provincial guidance for directing the patient to the appropriate care pathway.

**Table 3: Postacute Care Patient Groups**

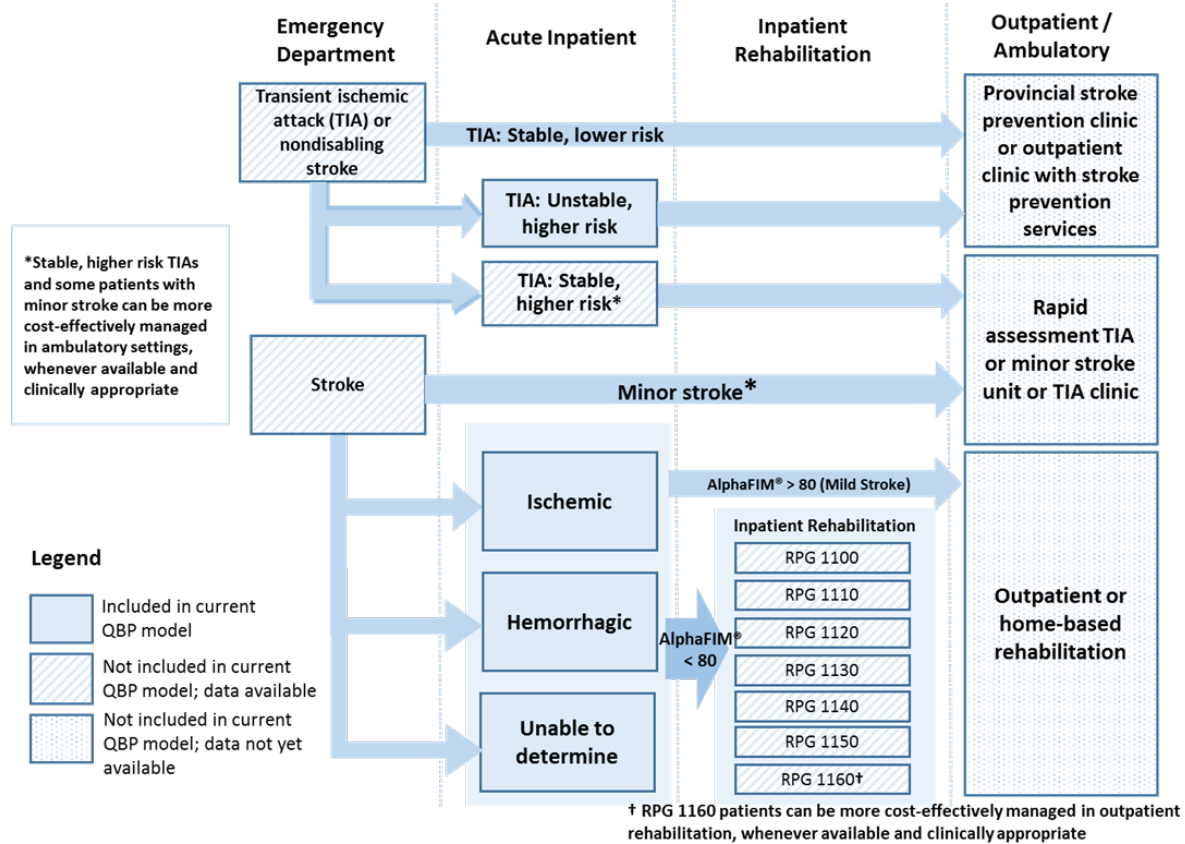
<b>Patient Group</b>	<b>Patient Characteristics/Triage Criteria</b>	<b>Recommended Care Pathway</b>
1. Stroke: <b>mild</b> (AlphaFIM >80)	Patients presenting to hospital with acute stroke, based on an AlphaFIM score of >80 on or by Day 3 after admission (target Day 3, admission day is day 1), or without other considerations (e.g., advanced age, caregiver availability, severe cognitive/perceptual needs, severe aphasia/dysphagia, profound inattention/neglect)	Admit to acute inpatient care if discharge home is unsafe or otherwise contraindicated  FOLLOWED BY  Discharge to the first of the following settings that is clinically appropriate and available: <ul style="list-style-type: none"><li>• home/community, and referral to outpatient clinic with stroke-prevention services</li><li>• outpatient/home-based rehabilitation</li></ul> inpatient rehabilitation, followed by outpatient/home-based rehabilitation
2. Stroke: <b>moderate</b> (AlphaFIM 40– 80)	Patients presenting to hospital with acute stroke, based on an AlphaFIM score of 40–80 on or by Day 3 after admission (target Day 3, admission	Admit to inpatient rehabilitation  FOLLOWED BY

Patient Group	Patient Characteristics/Triage Criteria	Recommended Care Pathway
	day is day 1), or with significant considerations (e.g., advanced age, caregiver availability, severe cognitive/perceptual needs, severe aphasia/dysphagia, profound inattention/neglect)	Discharge home with outpatient/home-based rehabilitation and/or community-based supports, where required
3. Stroke: <b>severe</b> (AlphaFIM <40)	Patients presenting to hospital with acute stroke, with an AlphaFIM score of <40 on or by Day 3 after admission ( target Day 3, admission day is day 1)	Admit to inpatient rehabilitation, if able to tolerate, OR (if not able to tolerate) consider as candidate for discharge to CCC or a slow-stream rehabilitation program, followed by admission to inpatient rehabilitation where possible FOLLOWED BY Discharge home with outpatient/home-based rehabilitation and/or community-based supports, where required

Abbreviation: CCC, complex continuing care; CT, computed tomography; FIM, Functional Independence Measure; TIA, transient ischemic attack.

# Stroke Cohort: Schematic

Figure 3 describes the stroke cohort as it is defined in the various care settings.



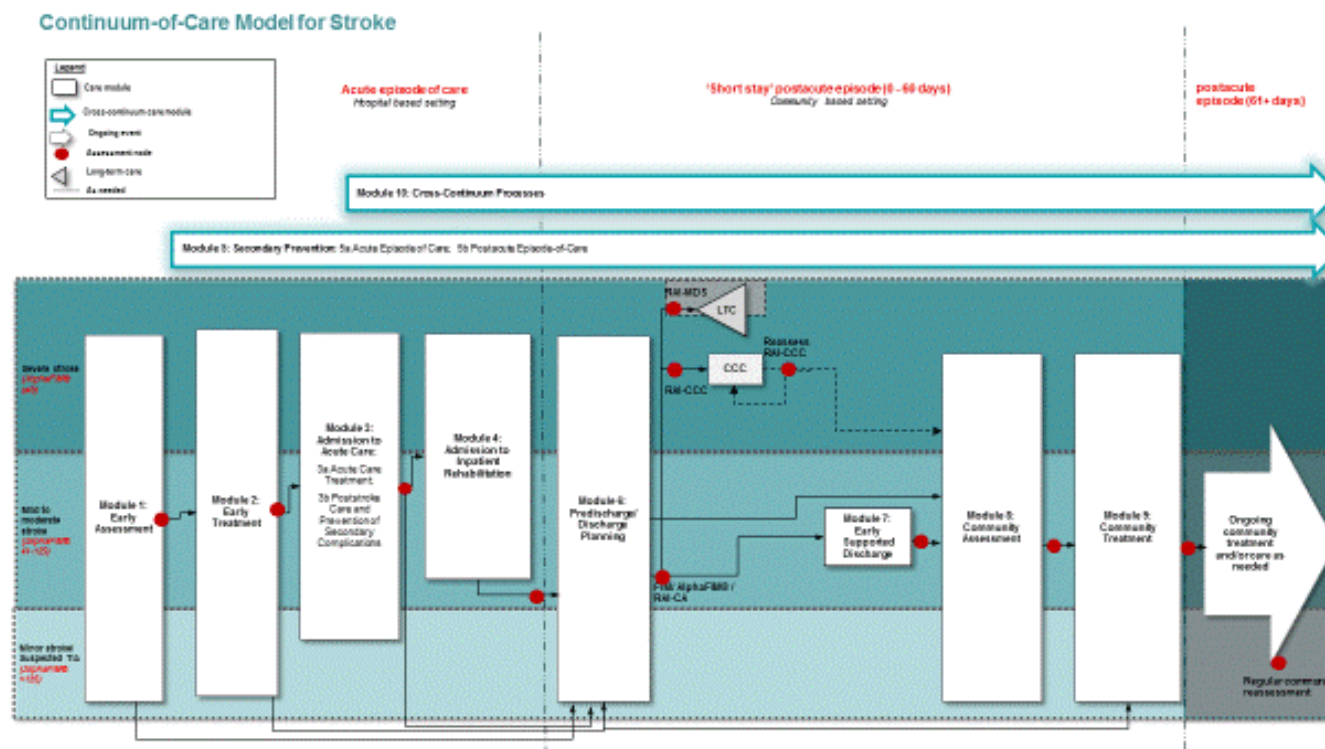
**Figure 3: Flow Chart for the Stroke Patient Cohort Across Care Settings**

Abbreviations: FIM, Functional Independence Measure; QBP, Quality-Based Procedure; RPG, rehabilitation patient group; TIA, transient ischemic attack.

# Continuum-of-Care Model

Health Quality Ontario developed the stroke continuum-of-care model (Figure 4) based on the previous work of the expert advisory panels. It served as a working model while the components of this clinical handbook were being developed. Beginning as a simplified sketch of key phases in the episode of care, the model has been modified to reflect the entire continuum-of-care pathway as determined by the expert advisory panels.

The Recommended Practices sections divide the continuum into 2 episodes of care: acute care and postacute care.



**Figure 4: Continuum-of-Care Model for Stroke** Abbreviations: CA, contact assessment; CCC, complex continuing care; FIM, Functional Independence Measure; LTC, long-term care; MDS, minimum data set; RAI, Resident Assessment Instrument.

# Recommended Practices: Sources

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## Sources Used to Develop Recommended Practices

### Evidence-Based Analyses, Mega-Analyses, and OHTAC Recommendations

#### *Acute Episode of Care*

Three evidence-based analyses and their corresponding OHTAC recommendations were included as sources for the acute episode of care.

- Is Transient Ischemic Attack a Medical Emergency? An Evidence-Based Analysis (18)
- Is Transient Ischemic Attack a Medical Emergency? OHTAC Recommendation (19)
- Constraint-Induced Movement Therapy for Rehabilitation of Arm Dysfunction After Stroke in Adults: An Evidence-Based Analysis (20)
- Constraint-Induced Movement Therapy for Rehabilitation of Arm Dysfunction After Stroke in Adults: OHTAC Recommendation (21)
- Effect of Increased Intensity of Physical Therapy on Patient Outcomes After a Stroke: An Evidence-Based Analysis (22)
- Effect of Increased Intensity of Physical Therapy on Patient Outcomes After a Stroke: OHTAC Recommendation (23)
- Mechanical Thrombectomy for Patients with Acute Ischemic Stroke: OHTAC Recommendation (24)

#### *Postacute Episode of Care*

One mega-analysis and its corresponding OHTAC recommendation were included as sources for the postacute episode of care.

- Optimizing Chronic Disease Management in the Community (Outpatient) Setting (OCDM): An Evidentiary Framework (25)
- Optimizing Chronic Disease Management in the Community (Outpatient) Setting (OCDM): OHTAC Recommendation (26)

### Clinical Handbooks

#### *Acute Episode of Care*

The published clinical handbook on the acute stroke episode of care was the primary source for the acute episode of the continuum of care.

- Quality-Based Procedures: Clinical Handbook for Stroke (1)

#### *Postacute Episode of Care*

Four clinical handbooks were included as sources for the postacute episode of the continuum of care.

- Quality-Based Procedures: Clinical Handbook for Stroke (1)

- Quality-Based Procedures: Clinical Handbook for Chronic Obstructive Pulmonary Disease (27)
- Quality-Based Procedures: Clinical Handbook for Congestive Heart Failure (28)
- Quality-Based Procedures: Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations (29)

Although the original clinical handbook for stroke (1) described only the acute episode of care, many of its recommendations were also relevant for the postacute episode. The Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations (29) was created concurrently with this handbook; it identified recommendations for all postacute patients in the community, including postacute stroke patients.

## **Rapid Reviews**

Rapid reviews were conducted on specific topics where gaps or inconsistencies in the evidence were identified, or as requested by the stroke expert advisory panels. Complete rapid review reports can be found online. The conclusions from the rapid reviews are included in each of the episode-of-care modules.

### ***Acute Episode of Care***

Two rapid reviews were included as part of the evidence for the acute episode of care.

- Optimal Onset-to-Admission Interval for Inpatient Stroke Rehabilitation: A Rapid Review
- The Effect of a 60-Minute Door-to-Needle Tissue Plasminogen Activator on Stroke Disability: A Rapid Review

### ***Postacute Episode of Care***

Six rapid reviews from the Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations (29) were included as part of the evidence for the postacute episode of care:

- Home-Based Versus Centre-Based Rehabilitation for Community-Dwelling Postacute Stroke Patients: A Rapid Review
- Home-Based Versus Centre-Based Rehabilitation for Community-Dwelling Postacute Stroke Patients: An Economic Rapid Review
- Self-Management and Educational Interventions in the Post-Acute Stroke Population: A Rapid Review
- Cardiovascular and Aerobic Exercise in Postacute Stroke Patients: A Rapid Review
- Care Coordination for Postacute Stroke, Chronic Obstructive Pulmonary Disease, and Heart Failure Clients: A Rapid Review
- Care Coordination for Postacute Stroke, Chronic Obstructive Pulmonary Disease, and Heart Failure Clients: An Economic Rapid Review

## Clinical Guidelines

### *Acute Episode of Care*

Since the development of the original stroke clinical handbook, (1) an updated version of the Canadian stroke guideline has been published. The updated guideline has continued to be the reference standard for this clinical handbook because of its quality and relevance.

- Canadian Stroke Best Practice Recommendations for Stroke Care, Update 2015 (31)

Four other international clinical guidelines were identified that included the acute episode of care.

- Scottish Intercollegiate Guidelines Network. Guidelines for the Management of Patients With Stroke or TIA: Assessment, Investigation, Immediate Management and Secondary Prevention, 2008 (32)
- Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Health Care Professionals From the American Heart Association/American Stroke Association, 2013 (33)
- 2015 AHA/ASA focused update of the 2013 guidelines for the early management of patients with acute ischemic stroke regarding endovascular treatment: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2015;46 (34)
- National Collaborating Centre for Chronic Conditions. Stroke: National Clinical Guideline for Diagnosis and Initial Management of Acute Stroke and TIA, 2008 (35)
- Australian Clinical Guidelines for Stroke Management, 2010 (36)

### *Postacute Episode of Care*

One Canadian guideline was used as the reference standard for the postacute episode of care due to its relevance and local context.

- Canadian Stroke Best Practice Recommendations for Stroke Care, Update 2013 (30)

Four other international clinical guidelines were identified that included the postacute episode of care.

- Scottish Intercollegiate Guidelines Network. Guidelines for the Management of Patients with Stroke, 2010 (34)
- United States Veterans Affairs and Department of Defense Clinical Practice Guideline for the Management of Stroke Rehabilitation, 2010 (35)
- National Institute for Health and Care and Excellence Clinical Guideline for Stroke, 2013 (36)
- Australian Clinical Guidelines for Stroke Management, 2010 (33)

## Other Sources

The following sources were also used to devise and further inform recommendations, and to ensure consistent care across the province.

### *Acute Episode of Care*

- Ontario Stroke Network, 2014 (40)
- Mechanical thrombectomy in acute ischemic stroke: A systematic review. *Can. J Neurol Sci* 2016; 00:1-6 (41)
- Endovascular thrombectomy after large vessel ischaemic stroke: A meta-analysis of individual patient data from five randomised trials. *The Lancet* 2016; Published online February 18 2016 [http://dx.doi.org/10.1016/S0140-6736\(16\)00163-X](http://dx.doi.org/10.1016/S0140-6736(16)00163-X) (42)
- Training Guidelines for Endovascular Ischemic Stroke Intervention: An International Multi-Society Consensus Document. *AJNR Am J Neuroradiol.* 2016 Apr;37(4):E31-4. (43)

### *Postacute Episode of Care*

- Adopting a Common Approach to Transitional Care Planning: Helping Health Links Improve Transitions and Coordination of Care (44)
- Canadian Council of Motor Transport Administrators Medical Standards for Drivers (45)
- International Diabetes Federation Worldwide Definition of the Metabolic Syndrome (46)
- Any scientific report presented by members of the expert advisory panel was incorporated into corresponding recommendations, particularly if the evidence contextualized the recommendation for Ontario:
  - Southwest Local Health Integration Network Community Rehabilitation Team report on home-based rehabilitation (47)
  - Post-Stroke Checklist (PSC), endorsed by the Canadian Stroke Network and World Stroke Organization (48)
  - The Patient and Family Guide to Canadian Stroke Best Practice Recommendations for Stroke Care (49)
  - Fundamentals of Addiction: A Practical Guide for Counsellors by CAMH (50)
  - The 2014 Canadian Hypertension Education Program (CHEP) Recommendations for Blood Pressure Measurement, Diagnosis, Assessment of Risk, Prevention and Treatment of Hypertension (51)
  - Canadian Diabetes Association (CDA) clinical practice guidelines (52)
  - A Consensus on Stroke Early Supported Discharge (53)
  - Canadian Centre on Substance Abuse Evidence and Guidelines (54)
  - Community Care Access Centres: Client Services Policy Manual (55)
  - Registered Nurses' Association of Ontario Guidelines for Management of Stage I to IV Pressure Ulcers (56)
  - Guidelines for Community-Based Exercise Programs for People with Stroke Working Group and Endorsed by the Ontario Stroke Network (57)
  - Alcohol and Health in Canada: A Summary of Evidence and Guidelines for Low-Risk Drinking (58)
- Where other forms of evidence were lacking, expert advisory panel opinion and consensus were incorporated.

# Quality Assessment for Guidelines

Quality assessment for each of the guidelines using the AGREE (5) domain scores is presented in Table 4. Given the limited number of guidelines identified for each cohort, the expert advisory panels considered all guideline recommendations.

**Table 4: AGREE II Domain Scores for Stroke Guidelines**

Guideline, Year	AGREE II Domain					
	Scope and Purpose	Stakeholder Involvement	Rigour of Development	Clarity of Presentation	Applicability	Editorial Independence
<b>Acute Episode of Care</b>						
CSBPR, 2013 (37)	83%	97%	<b>79%</b>	94%	92%	67%
SIGN, 2008 (38)	94%	100%	<b>83%</b>	94%	56%	46%
AHA/ASA, 2013 (39)	67%	67%	<b>52%</b>	94%	58%	88%
NHS/NICE, 2008 (40)	97%	97%	<b>82%</b>	100%	79%	92%
Australia, 2010 (41)	89%	83%	<b>88%</b>	100%	100%	100%
<b>Postacute Episode of Care</b>						
CSBPR, 2013 (37)	83%	97%	<b>79%</b>	94%	92%	67%
SIGN, 2010 (42)	61%	78%	<b>67%</b>	78%	83%	8%
VA/DoD, 2010 (43)	89%	50%	<b>67%</b>	78%	50%	58%
NICE, 2013 (44)	89%	83%	<b>71%</b>	94%	71%	100%
Australia, 2010 (41)	89%	83%	<b>88%</b>	100%	100%	100%

Abbreviations: AGREE, Appraisal of Guidelines for Research & Evaluation; AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; NHS/NICE, National Health Service/National Institute for Health and Care Excellence; SIGN, Scottish Intercollegiate Guidelines Network; VA, Veterans Affairs.

The guidelines supporting Health Quality Ontario expert advisory panel recommendations were summarized, and the quality of evidence supporting each recommendation was determined. The quality assessment tools used by each guideline are outlined in Table 5.

**Table 5: Summary of Evidence Assessments Used by Included Guidelines**

Organization	Grade of Recommendation/Level of Evidence
<b>Acute Episode of Care</b>	
CSBPR, 2015 (31)	<p><b>A:</b> RCTs or meta-analyses of RCTs; desirable effects clearly outweigh undesirable effects, or vice versa</p> <p><b>B:</b> single RCT or well-designed nonrandomized and/or noncontrolled trials and large observational study with strong evidence</p> <p><b>C:</b> writing group consensus and/or supported by limited research evidence. May be key system drivers supporting other recommendations or based on common, new, emerging evidence or practice patterns</p>
SIGN, 2008 (32)	<p><b>A:</b> at least 1 meta-analysis, systematic review, or high-quality RCT</p> <p><b>B:</b> high-quality systematic reviews of case-control or cohort studies; or high-quality case-control or cohort studies demonstrating a high probability of causal relationship; or extrapolated evidence from A</p> <p><b>C:</b> well-conducted case-control or cohort studies with a moderate probability that the relationship is causal; or extrapolated evidence from B</p> <p><b>D:</b> nonanalytic studies and expert opinion, or extrapolated evidence from C</p>
AHA/ASA, 2015 (34)	<p><b>Class I:</b> benefit &gt;&gt;&gt; risk, and the procedure should be performed</p> <p><b>Class IIa:</b> benefit &gt;&gt; risk, and it is reasonable to perform the procedure</p> <p><b>Class IIb:</b> benefit ≥ risk, and the procedure may be considered</p> <p><b>Class III:</b> no benefit or harm, and the procedure may not be helpful or has no proven benefit or may have excess cost without benefit or harmful to patients</p> <p><b>Level A:</b> data are derived from multiple RCTs or meta-analyses</p> <p><b>Level B:</b> data are derived from a single RCT or nonrandomized studies</p> <p><b>Level C:</b> consensus opinion of experts, case studies, or standard of care</p>
NHS/NICE, 2008 (39)	<p><b>1++:</b> high-quality meta-analyses, systematic reviews of RCTs, or RCTs with very low risk of bias</p> <p><b>1+:</b> well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with low risk of bias</p> <p><b>1–:</b> meta-analysis, systematic reviews of RCTs, or RCTs with high risk of bias; studies are not used as a basis for making a recommendation</p> <p><b>2++:</b> high-quality systematic reviews of case-control or cohort studies; high-quality case-control or cohort studies with very low risk of confounding, bias, or chance, and a high probability that the relationship is causal</p> <p><b>2+:</b> well-conducted case-control or cohort studies with a low risk of confounding, bias, or chance, and a moderate probability that the relationship is causal</p> <p><b>2–:</b> case-control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal; studies are not used as a basis for making a recommendation</p> <p><b>3:</b> nonanalytic studies (e.g., case reports, case series)</p> <p><b>4:</b> expert opinion, formal consensus</p>
Australia, 2010 (36)	<p><b>A:</b> body of evidence can be trusted to guide practice</p> <p><b>B:</b> body of evidence can be trusted to guide practice in most situations directly applicable to the target population</p> <p><b>C:</b> body of evidence provides some support for recommendation(s), but care should be taken in its application</p> <p><b>D:</b> body of evidence is weak and recommendation must be applied with caution</p> <p><b>GPP:</b> recommended best practice based on clinical experience and expert opinion</p>
<b>Postacute Episode of Care</b>	
CSBPR, 2013 (30)	<p><b>A:</b> RCTs or meta-analyses of RCTs; desirable effects clearly outweigh undesirable</p>

	<p>effects, or vice versa</p> <p><b>B:</b> single RCT or well-designed observational study with strong evidence</p> <p><b>C:</b> at least 1 well-designed, nonexperimental descriptive study or expert opinion</p>
SIGN, 2010 (37)	<p><b>A:</b> at least 1 meta-analysis, systematic review, or high-quality RCT</p> <p><b>B:</b> high-quality systematic reviews of case-control or cohort studies; or high-quality case-control or cohort studies demonstrating a high probability of causal relationship; or extrapolated evidence from A</p> <p><b>C:</b> well-conducted case-control or cohort studies with a moderate probability that the relationship is causal; or extrapolated evidence from B</p> <p><b>D:</b> nonanalytic studies and expert opinion, or extrapolated evidence from C</p>
VA/DoD, 2010 (38)	<p><b>A:</b> good evidence was found that the intervention improves important health outcomes and concludes that benefits substantially outweigh harm</p> <p><b>B:</b> at least fair evidence was found that the intervention improves health outcomes and concludes that benefits outweigh harm</p> <p><b>C:</b> at least fair evidence was found that the intervention can improve health outcomes, but concludes that the balance of benefits and harms is too close to justify a general recommendation</p> <p><b>D:</b> at least fair evidence was found that the intervention is ineffective or that harms outweigh benefits</p> <p><b>I:</b> evidence that the intervention is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined</p>
NICE, 2013 (39)	<p><b>High:</b> further research is very unlikely to change our confidence in the estimate of effect</p> <p><b>Moderate:</b> further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate</p> <p><b>Low:</b> further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate</p> <p><b>Very low:</b> any estimate of effect is very uncertain</p>
Australia, 2010 (36)	<p><b>A:</b> body of evidence can be trusted to guide practice</p> <p><b>B:</b> body of evidence can be trusted to guide practice in most situations directly applicable to the target population</p> <p><b>C:</b> body of evidence provides some support for recommendation(s), but care should be taken in its application</p> <p><b>D:</b> body of evidence is weak and recommendation must be applied with caution</p> <p><b>GPP:</b> recommended best practice based on clinical experience and expert opinion</p>

Abbreviations: AGREE, Appraisal of Guidelines for Research & Evaluation; AHA/ASA, American Heart Association/American Stroke Association; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; NHS/NICE, National Health Service/ National Institute for Health and Care Excellence; NICE, National Institute for Health and Care Excellence; RCT, randomized controlled trial; SIGN, Scottish Intercollegiate Guideline Network; VA, Veterans Affairs.

# Language Used to Reference Contributing Sources of Evidence

For clarity and transparency, the following terms were consistently applied to describe how the expert advisory panel used various evidence sources to develop the episode-of-care recommended practices.

<i>Taken from</i>	Recommendation was taken directly from another source.
<i>Modified</i>	Minor modifications from the source materials were made to the recommendation.
<i>Consistent with the</i>	Recommendation was consistent with the other sources, but wording of the recommendations were developed by the expert advisory panel.
<i>Based on the</i>	Recommendation was largely derived from a source but was not taken verbatim, or it was developed by expert advisory panel consensus.

## What's New?

During Phase 4, some recommended practices were added, amended, and/or deleted. Specifically, best practice recommendations for Endovascular Treatment were added to the acute episode of care, specifically Modules 1-3. The Post Acute Care Modules found in section titled “Recommended Practices for TIA and Minor (Non-disabling) Stroke” were removed and can be found in the Post Acute Care section. More specific changes and their recommendation numbers are provided below.

### Additions

- Recommendation 1.2.2: change to the treatment window timing
- Recommendation 1.2.3: rapid brain imaging including CTA
- Recommendation 1.2.4: multiphase CTA
- Recommendation 1.2.5: rapid brain imaging interpreted by a provider with expertise
- Recommendation 2.3.1: reference to new cross-continuum modules
- Recommendation 2.4.1: OHTAC recommendation on the management of patients with TIA
- Recommendation 2.4.2: TIA patients to consider for admission
- Recommendation 2.4.4: acetylsalicylic acid in patients who failed the NPO (*nil per os*, or nothing by mouth) screen
- Recommendation 2.5.2: revision of door-to-needle timing of tissue plasminogen activator administration
- Recommendation 2.6.1: change to the treatment window timing
- Recommendation 2.6.3: EVT Imaging Criteria
- Recommendation 2.6.4: use of EVT and thrombolysis
- Recommendation 2.6.5: EVT Centre Criteria
- Recommendation 2.6.6: EVT post procedural care
- Recommendation 2.6.7: Stroke unit care for EVT patients
- Recommendation 3.1.1: OSN Stroke Unit definition

- Recommendation 3.1.4: access to interprofessional team
- Recommendation 3.5.1: reference to new cross-continuum modules
- Recommendation 3.6.1: screening and management of diabetes
- Recommendation 3.6.2: OHTAC recommendation on smoking cessation
- Recommendation 3.6.4: intermittent pneumatic compression devices
- Recommendation 3.9.1: treatment of hypertension in patients with ischemic stroke
- Recommendation 4.3.5: OHTAC recommendation on intensity of inpatient rehabilitation
- Recommendation 4.3.7: OHTAC recommendation on constraint-induced movement therapy
- Recommendation 5.1.1: echocardiography
- Recommendation 5.1.2: serial electrocardiograms (and holter monitoring)
- Recommendation 5.1.3: hypercoagulability in young (< 45 years) patients
- Recommendation 5.3.1: ischemic stroke and atrial fibrillation treatment

## **Amendments**

- Recommendation 1.2.6: blood work, list of tests modified
- Recommendation 2.1.2: random glucose level changed
- Recommendation 2.7.1: description of treatment to reverse coagulopathy updated
- Recommendation 3.2.1: early mobilization recommendation updated
- Recommendation 3.1.5: description of health care providers, level of evidence updated
- Recommendation 3.3.2: description of timing for AlphaFIM updated for clarity
- Recommendation 3.6.20: level of evidence updated
- Recommendation 3.9.1: blood pressure management for patients with intracerebral hemorrhage
- Recommendation 4.1.3: level of evidence updated
- Recommendation 4.1.4: description of interprofessional team updated
- Recommendation 4.2.3 The FIM tool should be used as a standard assessment tool
- Recommendation 5.2.1: apixaban no longer pending Health Canada approval
- Recommendation 5.3.1: level of evidence updated

## **Deletions**

- Recommendations about telestroke networks have been removed from the modules and included in Context and Health Care System Considerations, below.
- Recommendations about “unable to determine” stroke types have been removed, since all stroke patients should be identified.

# **Context and Health Care System Considerations**

The following sections outline recommended best practices for the stroke continuum of care (Figure 4). The expert advisory panel has provided the following context and health care system considerations to support best practices and ensure quality care for Ontario stroke patients.

## Stroke Networks

- Geographic networks should contain an appropriate mix of specialization levels to serve the patient population. (29) This may require rationalization and reorganization of existing resources at both the regional and institutional levels, as well as ongoing improvement at individual levels of care.
- Each network should continue to develop expertise and mechanisms to deliver high-quality evidence-based stroke care, optimizing structural resources (e.g., human, equipment, and space), geographic factors, and patient populations. (29) Optimal stroke services should include the following characteristics:
  - All members of the public should be able to recognize the signs and symptoms of stroke, and react immediately by calling 911 or their local emergency number. (29)
  - Out-of-hospital patient management should be optimized to meet the needs of suspected acute stroke patients, including recognition, management, and transport (which may be done concurrently).
  - Services should be aligned with the current Acute Stroke Paramedic Protocol, which has been developed to support evidence and practice around appropriate thrombolysis and Endovascular Treatment time window. (52)
  - Access should be available to stroke experts, diagnostic equipment and expertise, and a range of emergent and timely evidence-based treatment options.

## Telestroke

- Telestroke services should include assessment/treatment with tissue plasminogen activator thrombolysis and/or determining eligibility for endovascular treatment for acute stroke patients, stroke prevention, rehabilitation, home-based and ambulatory care to support optimal patient recovery, and family support, regardless of geographic location. (40)
- Telestroke should include both on-demand (urgent, unplanned) and scheduled access to specialized stroke services and include the following: (40)
  - Telestroke should be provided by dedicated stroke providers in acute care, prevention, rehabilitation, and the community.
  - Telestroke should be implemented within an established and coordinated stroke system, where stroke experts and referring sites can be connected in an efficient and organized manner.
- Telestroke care delivery modalities should be integrated into stroke care planning and service delivery across the continuum to ensure equal access to care across geographic regions.

## Transitions in Care

- Capacity and access to adequate outpatient stroke rehabilitation and community-based treatment and services need to be addressed to promote the movement of appropriate patients to community or ambulatory care and achieve the associated cost efficiencies.
- Comprehensive packages of services should target patients with a TIA or minor/mild stroke; patients with moderate stroke; and patients with severe stroke.

## Undetermined Stroke Type

- With improved access to imaging and ED health care provider education, the number of strokes reported as “undetermined type” should continue to decline to negligible levels.

### **Query-Coded Stroke**

- Stroke patients whose diagnosis is identified in the National Ambulatory Care Reporting System and Discharge Abstract Database with a “Q” or “query” code should be included in the cohort, but this should be a temporary measure. Establishing a definitive diagnosis of stroke should be a priority for all hospitals.

Recommendations are presented in their respective modules according to the continuum of care (Figure 5), but they are not necessarily in the order they should be conducted. **Recommendations should be read in full, and not in isolated sections.**

Modules 1 through 4 represent the acute episode of care. Module 5 includes recommendations related to secondary prevention that span the stroke continuum of care; some should be initiated during the acute episode of care, and others may be initiated shortly after discharge.



## Module 1: Early Assessment

This module identifies best practices for the early assessment of suspected TIA or minor (nondisabling) stroke. Patients typically present at the ED, but the same practices should be followed at an outpatient clinic or when patients are directly admitted to acute care. The recommendations emphasize assessing the patient to inform clinical decision-making and determine the most appropriate pathway.

Module 1 Recommended Practices	Contributing Sources of Evidence
<b>1.1 Initial evaluation</b>	
1.1.1 Rapid initial evaluation should be conducted for airway, breathing, and circulation	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation, level B evidence) and Australia (level C evidence)
<b>1.2 Initial examinations</b>	
1.2.1 All patients should undergo a neurological examination to determine focal neurological deficits and assess stroke severity on a standardized stroke scale (NIHSS or CNS for stroke)	Based on CSBPR (level B evidence)
1.2.2 All patients should undergo brain imaging (CT or MRI) immediately	Based on CSBPR (level A evidence); consistent with SIGN (level A recommendation), AHA/ASA (class I, level B recommendation), NHS/NICE (level 4 evidence), and Australia (level A evidence)
1.2.3 Brain imaging should be interpreted immediately by a health care provider with expertise in reading CT and/or MRI	Based on AHA/ASA (class I, level C evidence); modified by expert advisory panel consensus
1.2.4 All patients should undergo ECG to detect atrial fibrillation and other acute arrhythmias	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation, level B evidence) and Australia (level GPP evidence)
1.2.5 A chest x-ray should not delay assessment for thrombolysis	Taken from CSBPR (level C evidence); modified by expert advisory panel consensus
1.2.6 All patients should have the following blood work: <ul style="list-style-type: none"> <li>• CBC</li> <li>• electrolytes</li> <li>• creatinine</li> <li>• glucose</li> <li>• INR</li> <li>• partial thromboplastin time</li> <li>• troponin test (if clinically indicated)</li> </ul>	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level C recommendation), AHA/ASA (class I recommendation, level B and C evidence), and Australia (level GPP evidence)
<b>1.3 Assessment and early management of dysphagia</b>	
1.3.1 All patients with stroke should be made NPO initially and have their swallowing ability screened using a simple, valid, reliable, bedside testing protocol as part of their initial assessment and before initiating oral medication, fluid, or food	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation, level B evidence) and Australia (level B evidence)
1.3.2 All patients with stroke who are not alert within the first 24 hours should be monitored closely, and swallowing ability should be screened when clinically appropriate	Based on CSBPR (level C evidence); consistent with Australia (level GPP evidence)
1.3.3 Patients with stroke presenting with features indicating dysphagia or pulmonary aspiration should receive a full clinical assessment of their swallowing ability by a speech-language pathologist or appropriately trained specialist who would advise on swallowing ability and the required consistency of diet and fluids	Based on CSBPR (level B evidence)
<b>1.4 Cross-continuum prevention assessment and therapies</b>	
1.4.1 All patients, whether admitted to hospital or discharged from the ED, should be given appropriate cross-continuum secondary	Based on expert advisory panel consensus

Module 1 Recommended Practices	Contributing Sources of Evidence
prevention assessments and therapies (Modules 5 and 10)	
<b>1.5 Triage tool for patients with TIA</b>	
1.5.1 A standardized triage tool should be used to determine the appropriate location for the care of patients with TIA	Based on expert advisory panel consensus
<b>1.6 Initial examinations for TIA or minor (nondisabling) stroke</b>	
1.6.1 Patients with a TIA or minor (nondisabling) stroke presenting within 48 hours of symptom onset or with fluctuating motor or speech symptoms should undergo immediate vascular imaging of the neck arteries (carotid ultrasound, CTA, or MRA) unless the patient is clearly not a candidate for carotid artery revascularization	Based on CSBPR (level B evidence)
1.6.2 All other patients (presenting beyond 48 hours) with a TIA or ischemic stroke should undergo vascular imaging of the brain and neck arteries as soon as possible	Based on CSBPR (level B evidence)
<b>1.7 Recommendations are not applicable to TIA or minor (nondisabling) stroke</b>	
Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CBC, complete blood count; CSBPR, Canadian Best Practices Recommendations; CNS, Canadian Neurological Scale; CT, computed tomography; CTA, computed tomography angiography; ECG, electrocardiogram; ED, emergency department; INR, international normalized ratio; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging; NHS/NICE, National Collaborating Centre for Chronic Conditions; NIHSS, National Institute of Health Stroke Scale; NPO, <i>nil per os</i> (nothing by mouth); SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 1 Implementation Considerations
<p><b>General considerations</b></p> <ul style="list-style-type: none"> <li>• Where feasible, EMS should divert patients to regional or district stroke centres if there is suspicion of stroke/TIA</li> <li>• The process for EMS prenotification of the receiving hospital about a stroke/TIA patient arrival should be better established to ensure acute stroke teams receive timely and detailed information</li> <li>• Collaboration between local EMS and institutions that provide stroke services should occur in all stroke networks across the province to support quality improvement and facilitate access to stroke care</li> <li>• Ongoing education should be provided to EMS crews about the recognition of stroke/TIA symptoms and regional medical redirect protocols</li> <li>• Standardized stroke/TIA assessment and treatment protocols/tools should be developed and used in all Ontario hospital EDs</li> <li>• Upon receiving EMS prenotification, the receiving hospital's acute stroke team should be contacted and called to the ED (for appropriate patients)</li> <li>• Sufficient human resources capacity should be ensured so that patients can be diagnosed and treated in a timely manner</li> <li>• To facilitate early assessment, hospital-level CTAS I or CTAS II access to diagnostic imaging should be established for suspected stroke/TIA patients to facilitate early assessment</li> <li>• A referral process for rapid-assessment TIA and minor stroke units/TIA clinics and provincial stroke-prevention clinics should be established in all hospitals for patients who are not admitted to hospital</li> <li>• Efforts to raise public awareness about the symptoms of stroke/TIA and when to contact 911 should continue to be enhanced and funded</li> </ul> <p>Abbreviations: CTAS, Canadian Triage and Acuity Scale; ED, emergency department; EMS, emergency medical services; TIA, transient ischemic attack.</p>

## Module 2: Early Treatment

This module identifies best practices for the ED treatment of TIA or minor (nondisabling) stroke. The majority of TIA patients and some patients with minor stroke do not require admission to hospital and should be referred to an urgent TIA/minor stroke unit/TIA clinic/stroke-prevention clinic or comparable ambulatory care setting for rapid diagnostic and medical evaluation. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

Module 2 Recommended Practices	Contributing Sources of Evidence
<b>2.1 Glucose management</b>	
2.1.1 Hypoglycemia should be corrected immediately	Based on CSBPR (level B evidence)
2.1.2 Blood glucose measurement should be repeated if the first random glucose value is > 11 mmol/L	Based on CSBPR (level C evidence); consistent with NHS/NICE (level 1++ evidence) and Australia (level C evidence)
<b>2.2 Body temperature</b>	
2.2.1 Temperature should be evaluated as part of routine vital signs every 4 hours for first 48 hours	Based on CSBPR (level C evidence); consistent with SIGN (level C recommendation) and AHA/ASA (class I, level C evidence)
For temperature > 37.5 C:	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level C recommendation) and AHA/ASA (class I, level C evidence)
<ul style="list-style-type: none"> <li>• initiate temperature-reducing measures</li> <li>• investigate potential infection</li> <li>• initiate antipyretic and antimicrobial therapy as required</li> </ul>	
<b>2.3 Cross-continuum prevention assessment and therapies</b>	
2.3.1 All patients, whether admitted to hospital or discharged, should be given appropriate cross-continuum secondary prevention assessments and therapies (Modules 5 and 10)	Based on expert advisory panel consensus
<b>2.4 Management of patients with TIA or minor (nondisabling) stroke</b>	
2.4.1 The following OHTAC recommendations should be followed:	Based on the HQO EBA Is Transient Ischemic Attack a Medical Emergency?; (18) consistent with Australia (levels C and GPP evidence)
<ul style="list-style-type: none"> <li>• OHTAC recommends that patients presenting with a TIA with high-risk features<sup>a</sup> or a minor stroke<sup>b</sup> undergo a brain CT scan and initiation of antiplatelet therapy (provided this is not contraindicated) as soon as possible and no later than 24 hours after symptom onset, followed by other stroke-prevention treatments tailored to each patient. With respect to the location of care, OHTAC recommends that: <ul style="list-style-type: none"> <li>○ such immediate care be provided at a specialized TIA/minor stroke clinic<sup>c</sup></li> <li>○ where delays to accessing a specialized TIA/minor stroke clinic pose risks to patient health, evaluation (as outlined above) occur at an appropriately resourced ED, and further consideration be given to inpatient evaluation and management for stroke prevention. OHTAC further recommends the establishment of accreditation standards for TIA/minor stroke care to ensure equitable access to appropriate, high-quality care, irrespective of the location of initial presentation</li> <li>○ where medical attention has been sought after 48 hours from symptom onset, patients be referred for evaluation at a specialized TIA/minor stroke clinic or alternatively an outpatient clinic with stroke-prevention services<sup>d</sup> within 24 hours of initial presentation</li> </ul> </li> <li>• OHTAC recommends that patients presenting with a TIA without high-risk features<sup>a</sup> undergo a brain CT scan and initiation of antiplatelet therapy (provided this is not contraindicated) as soon as possible and no later than 24 hours after initial presentation, followed by referral to an outpatient clinic with stroke-prevention services<sup>d</sup> for comprehensive evaluation and management within 1 month of symptom onset</li> </ul>	

Module 2 Recommended Practices	Contributing Sources of Evidence
2.4.2 Some TIA patients, such as those who present with fluctuating or crescendo hemibody <sup>e</sup> motor weakness, sensory loss, or speech difficulty, should be evaluated in the ED to be considered for admission to hospital	Based on expert advisory panel consensus
2.4.3 Patients with TIA or minor (nondisabling) stroke who are not on an antiplatelet agent at the time of presentation should be started on antiplatelet therapy immediately with 1 of the following after brain imaging has excluded intracranial hemorrhage: <ul style="list-style-type: none"> <li>• ASA 160 mg loading dose, followed by enteric coated ASA (81–325 mg) daily. Most patients should be on a maintenance dose of 81 mg/day</li> <li>• clopidogrel 300 mg loading dose, followed by 75 mg/day</li> <li>• extended-release dipyridamole 200 mg/ASA 25 mg bid (load with ASA 160 mg first)</li> </ul>	Based on CSBPR (level A evidence)
2.4.4 Rectal or gastric ASA should be offered as necessary, such as for patients who fail swallowing screening	Based on expert advisory panel consensus

### 2.5–2.8 Recommendations are not applicable to TIA or minor (nondisabling) stroke

Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; ASA, acetylsalicylic acid; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Best Practices Recommendations; CT, computed topography; EBA, evidence-based analysis; ED, emergency department; HQO, Health Quality Ontario; OHTAC, Ontario Health Technology Advisory Committee; NHS/NICE, National Collaborating Centre for Chronic Conditions; SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack.

<sup>a</sup>Symptoms consistent with a hemispheric event, including sudden hemiparesis, speech difficulties, or monocular vision loss, and/or known high risk conditions associated with stroke, including atrial fibrillation (especially if inadequately anticoagulated) or known carotid artery atherosclerosis with > 50% stenosis (narrowing) on the side consistent with the hemispheric event.

<sup>b</sup>Patients with very mild persistent symptoms or no residual symptoms but with a small asymptomatic infarct (stroke) on imaging

<sup>c</sup>A clinic with stroke expertise and the resources to conduct all necessary investigations in 1 place to initiate rapid treatment, including brain and vascular imaging, heart monitoring, and laboratory tests.

<sup>d</sup>For example, a provincial stroke-prevention clinic or community neurology/internal medicine clinic with a stroke-prevention focus.

<sup>e</sup>Motor weakness may be in 1 body segment (face, arm, or leg), but sensory loss must involve at least 2 contiguous segments (face/arm or arm/leg) on 1 side of the body to be considered highest risk.

The following implementation considerations were noted by members of the expert advisory panel.

Module 2 Implementation Considerations
<b>General considerations</b> <ul style="list-style-type: none"> <li>• Standardized priority protocols should be established for all suspected stroke patients to receive treatment as soon as possible and be admitted to a stroke unit within the first few hours after presenting to an ED</li> <li>• Hospitals should have ready access to rectal ASA</li> </ul>

Abbreviations: ASA, acetylsalicylic acid; ED, emergency department.

## Module 3: Admission to Acute Care

This module identifies best practices for acute inpatient admissions (as described in recommendation 2.4.2 for the specific group of TIA patients who should be admitted). Module 3a provides recommendations for acute inpatient treatment, and module 3b provides recommendations for the prevention of secondary complications, which should be initiated in the acute care setting but also be considered as ongoing activities. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10). The Ontario Stroke Network revised the definition of a stroke unit “A geographical unit with identifiable co-located beds (eg 5A -7, 5A-8, 5A-9, 5A-10, 5A-11) that are occupied by stroke patients 75% of the time and has a dedicated interprofessional team with expertise in stroke care with the following professionals at a minimum nursing, physiotherapy, occupational therapy, speech language pathologist”). Ontario Stroke Network 2015

### Module 3a: Acute Care Treatment

Module 3a Recommended Practices	Contributing Sources of Evidence
<b>3.1 Stroke units</b>	
3.1.1 Patients should be admitted to a specialized, geographically defined hospital unit dedicated to the management of stroke patients A geographical unit with identifiable co-located beds (eg 5A -7, 5A-8, 5A-9, 5A-10, 5A-11) that are occupied by stroke patients 75% of the time and has a dedicated inter-professional team with expertise in stroke care with the following professionals at a minimum nursing, physiotherapy, occupational therapy, speech language pathologist”.	Based on an HQO special report (53) (moderate quality evidence); consistent with CSBPR (level A evidence), SIGN (level A recommendation), and Australia (level C evidence) Ontario Stroke Network
<ul style="list-style-type: none"><li>This recommendation is in accordance with the HQO Effectiveness of Stroke Unit Care: A Special Report, which concluded (61): Moderate quality evidence showed that persons admitted to a stroke unit had a significant reduction in death and the combined outcome of death or institutionalization, and a nonsignificant reduction in institutionalization. Low quality evidence showed that patients admitted to a stroke unit had a significant reduction in the combined outcome of death or dependency and length of hospital stay and a nonsignificant reduction in the outcome of dependency</li></ul>	
3.1.2 The core stroke unit team should consist of health care professionals with stroke expertise in medicine, nursing, occupational therapy, physiotherapy, speech-language pathology, social work, and clinical nutrition (a dietitian)	Based on CSBPR (level A evidence); consistent with Australia (level A evidence)
3.1.3 To have the necessary stroke expertise, the health care professionals on the core stroke unit team should be individuals who spend the vast majority of their time treating stroke patients and regularly complete education about stroke care	Based on CSBPR (no level of evidence provided); consistent with expert advisory panel consensus
3.1.4 Patients should have access to a specialized interprofessional team 7 days a week	Based on expert advisory panel consensus
3.1.5 Physiotherapy, speech-language pathology, and occupational therapy team members should assess stroke patients within 48 hours of admission to hospital and formulate a management plan	Based on CSBPR (level B evidence); modified by expert advisory panel consensus
<b>3.2 Early mobilization</b>	
3.2.1 All stroke patients admitted to hospital with acute stroke should be mobilized early(between 24 hours and 48 hours of stroke onset), unless contraindicated  Frequent out-of-bed activity in the very early time frame (within 24 hours of stroke onset) is not recommended Mobilization may be reasonable for some patients with acute stroke in the very early time frame and clinical judgement should be used.	Based on CSBPR (level B evidence); consistent with SIGN (level A recommendation) and Australia (level B evidence)

Module 3a Recommended Practices	Contributing Sources of Evidence
<b>3.3 Assessment</b>	
3.3.1 Clinicians should use standardized, valid assessment tools to evaluate patients' stroke-related impairments and functional status	Based on CSBPR (level of evidence B); consistent with SIGN (level C recommendation)
3.3.2 AlphaFIM should be completed on or by day 3 after admission(target day 3, admission day is day 1)	Based on expert advisory panel consensus in reference to the OSN Stroke Reference Group
3.3.3 All stroke patients should be assessed for risk of developing venous thromboembolism	Based on CSBPR (level of evidence not provided)
3.3.4 Early mobilization and adequate hydration should be encouraged for all acute stroke patients to help prevent venous thromboembolism	Based on CSBPR (level C evidence)
3.3.5 The nutrition and hydration status of stroke patients should be assessed within the first 48 hours of admission using a valid screening tool. Stroke patients with nutritional concerns, hydration deficits, dysphagia, or other comorbidities should be referred to a dietitian. Referral to a dietitian should be made within 7 days of admission for recommendations and for consideration of enteral nutrition support for patients who are unable to meet nutritional and fluid requirements	Based on CSBPR (level B evidence); consistent with SIGN (levels A-C recommendations) and AHA/ASA (class III, level B evidence)
<b>3.4 Recommendations are not applicable to TIA or minor (nondisabling) stroke</b>	
<b>3.5 Cross-continuum prevention assessment and therapies</b>	
3.5.1 All patients, whether admitted to in-hospital rehabilitation or discharged, should be given appropriate cross-continuum secondary prevention assessments and therapies (Modules 5 and 10)	Based on expert advisory panel consensus
Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Best Practices Recommendations; FIM, Functional Independence Measure; HQO, Health Quality Ontario; OSN, Ontario Stroke Network; SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 3a Implementation Considerations
<b>General considerations</b>
<ul style="list-style-type: none"> <li>All hospitals providing stroke/TIA care should ensure that the interprofessional stroke team uses standardized, validated assessment tools; where possible, these tools should be in electronic format linked to the EHR</li> <li>Patients should be screened/assessed for diabetes, dental issues, cognitive impairment, and depression upon presentation to the ED, and the results should be forwarded to the TIA clinic for follow-up</li> <li>Hospitals should ensure adequate staffing 7 days per week</li> </ul>
Abbreviations: ED, emergency department; EHR, electronic health record; TIA, transient ischemic attack.

## Module 3b: Poststroke Care and Prevention of Secondary Complications

Module 3b Recommended Practices	Contributing Sources of Evidence
<b>3.6 Screening and management of comorbid conditions</b>	
<b>Diabetes</b>	
3.6.1 Screening and management of diabetes should be conducted in accordance with the Canadian Diabetes Association guidance, available at: <a href="http://www.diabetes.ca/">http://www.diabetes.ca/</a>	Based on expert advisory panel consensus
<b>Smoking</b>	
3.6.2 The expert advisory panel recommends that the following OHTAC recommendation for smoking cessation among COPD patients (54) be considered for stroke patients as well:	Based on expert advisory panel consensus in consideration of the OHTAC recommendation and the HQO Smoking Cessation for Patients With Chronic Obstructive Pulmonary Disease: An Evidence-Based Analysis (55) (very low to moderate quality of evidence); consistent with CSBPR (level B evidence), SIGN (level B evidence), and Australia (level A evidence)
<ul style="list-style-type: none"> <li>OHTAC strongly endorses evidence-based strategies aimed at encouraging smoking cessation in patients with COPD</li> <li>Intensive counselling (≥ 90 minutes) is the most effective and cost-effective strategy, and should continue to be encouraged</li> <li>OHTAC recommends that consideration be made to providing training programs to health care professionals involved in providing intensive counselling</li> <li>OHTAC recommends bupropion or nicotine replacement therapies for smoking cessation. (Building on this OHTAC recommendation, all smokers should be considered for cessation medications [e.g., NRT, bupropion, varenicline, as appropriate] to aid in maximizing quit rates, unless contraindicated.)</li> </ul>	Consistent with the HQO Clinical Handbook for COPD
<b>Venous thromboembolism</b>	
3.6.3 Stroke patients at high risk for venous thromboembolism should be started on pharmacological venous thromboembolism prophylaxis after brain imaging has ruled out ICH:	
<ul style="list-style-type: none"> <li>subcutaneous low molecular weight heparin should be considered for most patients with ischemic stroke</li> <li>subcutaneous unfractionated heparin should be considered for patients with renal failure</li> </ul>	<p>Based on CSBPR (level A evidence)</p> <p>Based on CSBPR (level B evidence)</p>
3.6.4 Intermittent pneumatic compression devices should be used in patients who are at high risk for venous thromboembolism but have a contraindication to pharmacological thromboembolism prophylaxis, such as active systemic bleeding or high risk of bleeding	Based on expert advisory panel consensus
3.6.5 The use of antiembolic (compression) stockings for poststroke venous thromboembolism prophylaxis is not recommended	Based on CSBPR (level A evidence)
<b>Depression</b>	
3.6.6 Patients should be screened for depression using a validated tool, especially if there is a history or evidence of depression or mood change. All patients with stroke should be screened to determine if they have a history of or risk factors for depression	Based on CSBPR (level A evidence)
3.6.7 Patients identified at risk for depression during screening should be referred to a health care professional with expertise in diagnosis and management of depression	Based on CSBPR (level B evidence)
3.6.8 Screening should take place at various points along the episode of care, including during the inpatient hospital admission, early during rehabilitation and before discharge to the community, and whenever clinical presentations occur	Based on expert advisory panel consensus
<b>Incontinence</b>	
3.6.9 All stroke patients should be screened for urinary incontinence and retention, fecal incontinence, and constipation	Based on CSBPR (level C evidence)
3.6.10 A portable ultrasound should be used as the preferred noninvasive painless method for assessing postvoid residual urine volume in the bladder	Based on CSBPR (level C evidence); modified by expert advisory panel consensus

Module 3b Recommended Practices	Contributing Sources of Evidence
3.6.11 Indwelling catheters should be avoided due to the risk of urinary tract infection. If used, indwelling catheters should be assessed daily and removed as soon as possible	Based on CSBPR (level A evidence); consistent with AHA/ASA (class III, level C evidence)
3.6.12 A bladder-training program should be implemented in patients with urinary incontinence	Based on CSBPR (level C evidence)
3.6.13 A bladder-training program should include timed and prompted toileting on a consistent schedule	Based on CSBPR (level B evidence)
3.6.14 A bowel-management program should be implemented for stroke patients with persistent constipation or bowel incontinence	Based on CSBPR (level A evidence)
<b>Oral/dental</b>	
3.6.15 All stroke patients should have an oral/dental assessment, including screening for signs of dental disease, level of oral care, and appliances. An appropriate oral care protocol should be used for every patient, including those who use dentures	Based on CSBPR (level C evidence)
3.6.16 The oral care protocol should be consistent with Canadian Dental Association recommendations, which are currently: <ul style="list-style-type: none"> <li>• frequency of oral care (<math>\geq</math> twice/day)</li> <li>• types of oral care products (toothpaste, floss, and mouthwash)</li> <li>• management for patients with dysphagia</li> </ul>	Based on CSBPR (level B evidence)
<b>Cognitive impairment</b>	
3.6.17 All stroke patients with vascular risk factors and clinically evident stroke should be considered at high risk for vascular cognitive impairment	Based on CSBPR (level B evidence)
3.6.18 All high-risk patients should be screened for cognitive impairment using a validated screening tool	Based on CSBPR (level C evidence)
3.6.19 Screening to investigate a person's cognitive status should address arousal, alertness, attention, orientation, memory, language, agnosia, visuospatial/perceptual function, praxis, and executive functions, such as insight, judgment, social cognition, problem-solving, abstract reasoning, initiation, planning, and organization	Based on CSBPR (level C evidence)
3.6.20 The Montreal Cognitive Assessment is recommended when vascular cognitive impairment is suspected, as it is considered more sensitive than the Mini-Mental State Exam in these patients	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
3.6.21 Patients with identified cognitive impairments should receive additional cognitive or neuropsychological assessments to guide management	Based on CSBPR (level B evidence)
<b>3.7 Falls prevention</b>	
3.7.1 All patients with stroke should be screened at admission for risk of falls by an experienced clinician	Based on CSBPR (level C evidence)
3.7.2 A falls risk assessment should include comprehensive inter-professional assessment of medical functional history and examination of mobility, vision, perception, cognition, and cardiovascular status	Based on CSBPR (level B evidence)
3.7.3 Based on assessment, an individualized falls-prevention strategy should be implemented	Based on CSBPR (level C evidence)
<b>3.8 Patient and family education</b>	
3.8.1 Patients, families, and caregivers should be prepared for transitions between care environments through education and training, emotional support, and information related to community services specific to the transition they are undergoing	Based on CSBPR (level B evidence)
3.8.2 Patient and family education should occur at all stages of stroke care	Based on CSBPR (level of evidence not provided); consistent with SIGN (level A recommendation)

### 3.9–3.10 Recommendations are not applicable to TIA or minor (nondisabling) stroke

Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practices Recommendations; COPD, chronic obstructive pulmonary disease; HQO, Health Quality

Ontario; ICH, intracerebral hemorrhage; NRT, nicotine replacement therapy; OHTAC, Ontario Health Technology Advisory Committee; SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack.

The following implementation considerations were noted by members of the expert advisory panel.

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### Module 3b Implementation Considerations

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#### General considerations

- Hospitals that provide stroke/TIA services should ensure that their interprofessional team is skilled at assessing for all comorbid conditions, including neuropsychological issues

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Abbreviations: TIA, transient ischemic attack.

## **Module 4: Admission to Inpatient Rehabilitation**

This module does not apply to TIA/minor (nondisabling) stroke patients.

## Module 5: Secondary Prevention

This module identifies best practices for secondary prevention assessments and therapies. All activities should begin before discharge or shortly thereafter. Some activities are intended to begin in the acute episode of care (Module 5a), while others may begin immediately after discharge (Module 5b). This module is split into 2 sections to highlight these differences, but it should be seen as a continuum across the episodes of care.

### *Module 5a: Acute Episode of Care*

Module 5a Recommended Practices	Contributing Sources of Evidence
<b>5.1 Secondary prevention assessments and therapies</b>	
5.1.1 In patients with no identified stroke etiology (e.g., large artery atherosclerotic disease of the carotid arteries), echocardiography (either 2-D or transesophageal) should be completed for those with suspected embolic stroke and normal neurovascular imaging, as well as no absolute contraindications for anticoagulant therapy	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level B recommendation)
5.1.2 Serial ECGs (i.e., daily) should be done for the first 72 hours poststroke to detect atrial fibrillation and other acute arrhythmias	Based on CSBPR (level B evidence)
<ul style="list-style-type: none"> <li>For patients with TIA or embolic stroke without an identified etiology and where the serial ECGs in hospital are negative for atrial fibrillation, ambulatory holter cardiac monitoring should be completed (at least 48 hours, and repeated if the initial monitor is negative, or 14- to 30-day monitors should be considered)</li> </ul>	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.3 If hypercoagulability or vasculitis is suspected In young stroke patients (< 45 years old), they should be referred to a stroke specialist while in hospital for early evaluation and management and then to a stroke-prevention clinic or stroke specialist in the community for ongoing management	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.4 For patients with suspected vasculitis, the following blood work is recommended (with referral to rheumatology for further guidance): <ul style="list-style-type: none"> <li>erythrocyte sedimentation rate</li> <li>C-reactive protein</li> <li>antinuclear antibody</li> <li>syphilis screen</li> </ul>	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.5 A statin should be prescribed to most patients to achieve LDL cholesterol < 2.0 mmol/L or a 50% reduction in LDL cholesterol from baseline	Based on CSBPR (level B evidence); consistent with SIGN (level A recommendation) and Australia (level B evidence)
5.1.6 For patients with suspected hypercoagulability and no evident cause of stroke, the following blood work should be considered (but only done > 3 months poststroke): <ul style="list-style-type: none"> <li>antiphospholipid antibody</li> <li>lupus anticoagulant</li> <li>protein S</li> <li>protein C</li> <li>antithrombin III</li> <li>prothrombin gene mutation</li> <li>factor V Leiden mutation</li> </ul>	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.7 Patients with ipsilateral 50%–99% internal carotid artery stenosis should be evaluated by a stroke expert. Selected patients should be offered carotid endarterectomy with the goal of surgery within 14 days of the incident event and once the patient is clinically stable	Based on CSBPR (level A evidence); consistent with SIGN (level A recommendation) and NHS/NICE (level 1++ evidence)
5.1.8 Patients should be prescribed antiplatelet therapy for secondary prevention of recurrent stroke, unless there is an indication for anticoagulation	Based on CSBPR (level A evidence)

Module 5a Recommended Practices	Contributing Sources of Evidence
<b>5.2 Additional prevention therapies</b>	
5.2.1 Immediately after brain imaging has excluded intracranial hemorrhage or large infarct, patients with TIA and atrial fibrillation should begin oral anticoagulation with dabigatran, rivaroxaban, apixaban, or warfarin	Based on CSBPR (level A evidence); consistent with SIGN (level C recommendation)
5.2.2 Patients who have had a TIA should have treatment to lower their blood pressure consistently to < 140/90 mm Hg	Based on CSBPR (level B evidence)
<b>5.3 Recommendations are not applicable to TIA or minor (nondisabling) stroke</b>	
Abbreviations: Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practices Recommendations; ECG, electrocardiogram; ICH, intracerebral hemorrhage; LDL, low-density lipoprotein; NHS/NICE, National Collaborating Centre for Chronic Conditions; SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack	

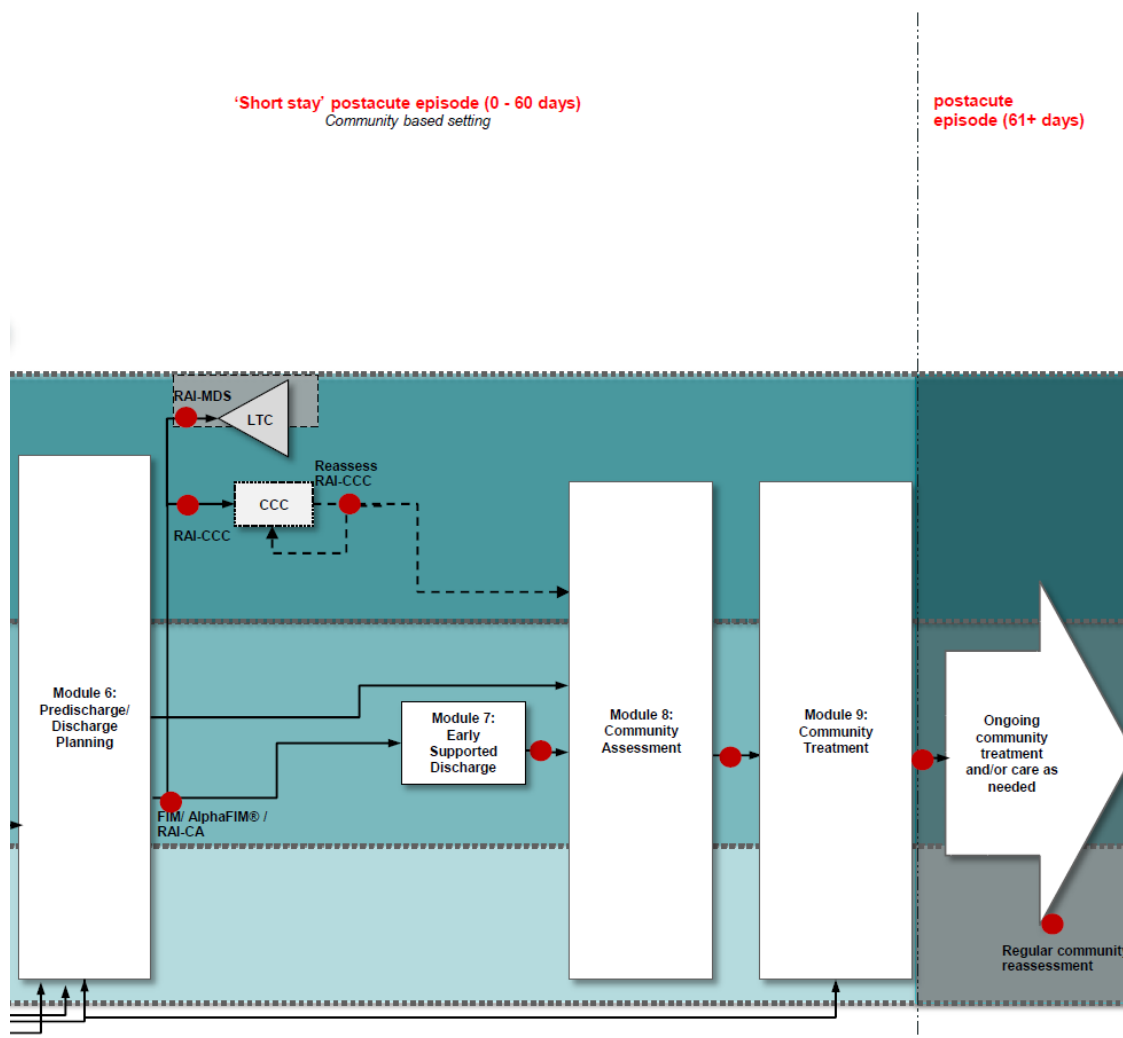
The following implementation considerations were noted by members of the expert advisory panel.

Module 5a Implementation Considerations
<b>General considerations</b>
<ul style="list-style-type: none"> <li>All patients diagnosed with TIA and discharged from the ED should have a referral sent to either a rapid-assessment TIA/minor stroke unit/TIA clinic or stroke-prevention clinic before they leave the ED</li> </ul>
Abbreviations: ED, emergency department; TIA, transient ischemic attack.

# Postacute Episode of Care

Module 5 includes recommendations related to secondary prevention. Module 5b includes activities that are initiated during the postacute episode of care. Modules 6 through 9 represent the postacute episode of care. Module 10 provides recommendations related to the entire continuum of stroke care, but it centres largely on activities outside the hospital setting.

Recommendations in the following modules are not to be considered in isolation from the earlier modules; **the entire episode of care should be considered as a whole**. Modules 6-10 can be found beginning on page 80.



**Figure 6: Postacute Episode-of-Care Model for Stroke**

Abbreviations: CA, contact assessment; CCC, complex continuing care; FIM, Functional Independence Measure; LTC, long-term care; MDS, minimum data set; RAI, Resident Assessment Instrument.

## Module 5: Secondary Prevention

This module identifies best practices for secondary prevention assessments and therapies. All activities should begin before discharge or shortly thereafter. Some activities are intended to begin in the acute episode of care (Module 5a), while others may begin immediately after discharge (Module

5b). This module is split into 2 sections to highlight these differences, but it should be seen as a continuum across the episode of care.

### ***Module 5b: Postacute Episode of Care***

<b>Module 5b Recommended Practices</b>	<b>Contributing Sources of Evidence</b>
<b>5.4 Lifestyle modification</b>	
5.4.1 Patients who have had a stroke should be assessed for vascular disease risk factors and lifestyle management issues. They should receive information and counselling about possible strategies to modify their lifestyle and risk factors in conjunction with appropriate medical treatment and/or pharmacotherapy.	Based on CSBPR; modified by expert advisory panel consensus
5.4.2 Based on initial assessment, the interventions should be delivered by a health care professional with skills and training in behaviour modification	Based on expert advisory panel consensus in reference to the CAMH guide; (44) modified by expert advisory panel consensus
<b>Healthy balanced diet</b>	
5.4.3 Patients should eat a diet high in fresh fruits, vegetables, low-fat dairy products, dietary and soluble fibre, whole grains, and protein from plant sources. It should be low in saturated fat, trans fat, cholesterol and sodium, in accordance with <i>Canada's Food Guide to Healthy Eating</i> . (55)	Based on CSBPR (level B evidence); modified by the expert advisory panel consensus; consistent with Australia and VA/DoD
<b>Sodium</b>	
5.4.4 Sodium intake should be restricted to 2000 mg/day (5 g of salt or 87 mmol of sodium). For detailed sodium recommendations, refer to the CHEP recommendations, endorsed by Hypertension Canada (45)	Based on expert advisory panel consensus in reference to the CHEP guidelines; consistent with CSBPR, Australia, and VA/DoD
<b>Exercise</b>	
5.4.5 Patients should participate in moderate exercise (an accumulation of 30 to 60 minutes), such as walking (ideally brisk walking), jogging, cycling, swimming, or other dynamic exercise 4 to 7 days each week in addition to routine ADLs	Taken from CSBPR (level A evidence); consistent with Australia
5.4.6 High-risk patients (e.g., those with cardiac disease) should engage in medically supervised exercise programs. Refer also to the recommendations on aerobic exercise	Taken from CSBPR (level A evidence)
<b>Smoking</b>	
5.4.7 Patients who smoke should receive smoking cessation counselling and referral to a smoking-cessation program. This may include providing information to patients with contact information and instructions for resources or other guidance	Based on the QBP Clinical Handbook for COPD and the QBP Clinical Handbook for Community-Acquired Pneumonia; modified by expert advisory panel consensus; consistent with CSBPR, Australia, and VA/DoD
<b>Alcohol consumption</b>	
5.4.8 Men: Limiting alcohol consumption to 0–3 standard drinks <sup>a</sup> per day and no more than 15 standard drinks <sup>a</sup> per week	Based on expert advisory panel consensus in reference to the Canadian low-risk drinking guidelines (48)
5.4.9 Women: Limiting alcohol consumption to 0–2 standard drinks <sup>a</sup> per day and no more than 10 standard drinks <sup>a</sup> per week	Based on expert advisory panel consensus in reference to the Canadian low-risk drinking guidelines (48)
<b>Weight</b>	
5.4.10 Patients should maintain a BMI of 18.5 to 24.9 kg/m <sup>2</sup> . Alternatively, they should maintain a waist circumference of:	Based on expert advisory panel consensus in reference to the IDF guidelines
<ul style="list-style-type: none"> <li>• Europeans: &lt; 80 cm for females and &lt; 94 cm for males</li> <li>• South Asians: &lt; 80 cm for females and &lt; 90 cm for males</li> <li>• Chinese: &lt; 80 cm for females and &lt; 90 cm for males</li> <li>• Japanese: &lt; 80 cm for females and &lt; 90 cm for males</li> <li>• Ethnic South and Central Americans: use the South Asian recommendations until more specific data are available</li> </ul>	

Module 5b Recommended Practices	Contributing Sources of Evidence
<ul style="list-style-type: none"> <li>Sub-Saharan Africans: use the Europid recommendations until more specific data are available</li> <li>Eastern Mediterranean and Middle East (Arab) populations: use the Europid recommendations until more specific data are available</li> </ul>	
5.4.11 All strategies to manage, prevent, and treat lifestyle-related health problems should be prescribed in conjunction with appropriate medical treatment and prevention and/or pharmacotherapy	Based on expert advisory panel consensus
<b>5.5 Blood pressure assessment and management</b>	
5.5.1 A person should have their blood pressure monitored at every clinical encounter	Based on expert advisory panel consensus
5.5.2 Proper standardized techniques should be followed for blood pressure monitoring, including office, home, and community testing	Based on expert advisory panel consensus
5.5.3 All patients, whether normotensive or hypertensive, should receive blood pressure–lowering therapy unless contraindicated by symptomatic hypotension, with first-line medications in the ACE inhibitor class with or without a diuretic added. Alternative medication classes include ARBs or calcium channel blockers. Unless the patient has a cardiovascular disease that requires their use, beta-blockers do not have benefits for stroke prevention in stroke patients	Based on Australia (level A evidence); modified by the expert advisory panel; consistent with CSBPR and VA/DoD
5.5.4 Blood pressure–lowering treatment is recommended for all patients to achieve a target consistently lower than 140/90 mm Hg, and in patients with diabetes, to less than 130/80 mm Hg	Based on expert advisory panel consensus in reference to the CHEP guidelines
5.5.5 Ambulatory blood pressure monitoring should be considered when an increase in blood pressure is suspected in treated patients with:	
<ul style="list-style-type: none"> <li>blood pressure that is not below target despite receiving appropriate chronic antihypertensive therapy</li> </ul>	Based on expert advisory panel consensus in reference to the CHEP guidelines
<ul style="list-style-type: none"> <li>symptoms suggestive of hypotension</li> </ul>	Based on expert advisory panel consensus in reference to the CHEP guidelines
<ul style="list-style-type: none"> <li>fluctuating office blood pressure readings</li> </ul>	Based on expert advisory panel consensus in reference to the CHEP guidelines
<b>5.6 Cholesterol and lipid management</b>	
5.6.1 Fasting lipid levels should be measured in all patients presenting with stroke or TIA	Based on CSBPR; modified by expert advisory panel consensus
<b>5.7 Diabetes screening</b>	
5.7.1 The Canadian Diabetes Association recommends that screening for diabetes be performed every 3 years in individuals 40 years of age or older or at high risk. Poststroke patients are higher-risk, and more frequent and/or earlier testing should be considered in those at very high risk or in people with additional risk factors for diabetes	Based on expert advisory panel consensus in reference to the Canadian Diabetes Association guidelines
<b>5.8 Diabetes management</b>	
5.8.1 Patients who are comorbid with diabetes should maintain:	Based on the Canadian Diabetes Association guidelines; modified by expert advisory panel consensus
<ul style="list-style-type: none"> <li>blood glucose target of HbA1c &lt; 7.0%</li> <li>blood pressure target of 130/80 mm Hg</li> <li>LDL cholesterol target of &lt; 2.0 mmol/L</li> </ul>	
<b>5.9 Sleep apnea</b>	
5.9.1 Patients should be screened for the presence of sleep apnea symptoms using a validated sleep apnea screening tool	Based on CSBPR; modified by expert advisory panel consensus
5.9.2 Referral to a sleep laboratory with expertise in stroke is recommended for patients in whom sleep apnea is suspected. Criteria for referral may include patients with risk factors for sleep disordered breathing or suspicion based on clinical assessment	Based on CSBPR; modified by expert advisory panel consensus

Module 5b Recommended Practices	Contributing Sources of Evidence
5.9.3 Efforts should be made in the professional education of sleep lab staff so they can develop stroke expertise, or efforts should be made to make sleep labs accessible	Based on the QBP Clinical Handbook for CHF; modified by the expert advisory panel
5.9.4 Patients and family members should be given ongoing education, counselling, and support about the signs, symptoms, and risks of sleep apnea, as well as compliance with treatment to reduce stroke recurrence and increase recovery	Based on expert advisory panel consensus
<b>5.10 Long-term management and rehabilitation</b>	
5.10.1 All patients should be assessed by a stroke expert (e.g., a neurologist, general internist, physiatrist, or other physician with stroke expertise) to ensure stroke-prevention strategies are continued from the acute care setting or initiated as appropriate. Transfer of information to the primary care provider is essential for them to continue long-term management	Based on expert advisory panel consensus
5.10.2 If available, initial postacute stroke/TIA care should be through a specialized stroke-prevention clinic with an interprofessional team that has expertise in stroke (see also OHTAC recommendation on TIA/minor stroke, recommendation 2.4.1)	Based on expert advisory panel consensus in consideration of the OHTAC recommendation and HQO EBA Is Transient Ischemic Attack a Medical Emergency? (18)
5.10.3 Patients should be followed regularly by a primary care provider to address ongoing issues with stroke risk factors, continue treatment of comorbidities, and refer to community-based resources as necessary	Based on VA/DoD; modified by expert advisory panel consensus
<ul style="list-style-type: none"> <li>The primary care provider should follow a Post Stroke Checklist (PSC) (42), endorsed by the World Stroke Organization and the Canadian Stroke Network, to make appropriate home care referrals</li> </ul>	Based on CSBPR; modified by expert advisory panel consensus
<b>5.11 Management of cholesterol</b>	
5.11.1 Statin agents should be prescribed for most patients who have had a TIA or ischemic stroke to achieve recommended lipid levels	Based on CSBPR (level A evidence); modified by expert advisory panel consensus
5.11.2 Patients with TIA or ischemic stroke should either achieve LDL cholesterol of < 2.0 mmol/L, or a reduction in LDL by 50% of their baseline level	Based on CSBPR (level A evidence); modified by expert advisory panel consensus
<b>5.12 Recommendations are not applicable to TIA or minor (nondisabling) stroke</b>	
<p>Abbreviations: ACE, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; BMI, body mass index; CAMH, Centre for Addiction and Mental Health; CSBPR, Canadian Stroke Best Practice Recommendations; CHEP, Canadian Hypertension Education Program; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; DoD, Department of Defence; EBA, evidence-based analysis; IDF, International Diabetes Federation; HbA1c, hemoglobin A1c; HQO, Health Quality Ontario; LDL, low-density lipoprotein; OHTAC, Ontario Health Technology Advisory Committee; QBP, Quality-Based Procedure; TIA, transient ischemic attack; VA, Veterans Affairs.</p> <p><sup>a</sup>A "standard drink" is equal to a 341 mL (12 oz) bottle of 5% strength beer, cider or cooler; a 142 mL (5 oz) glass of 12% strength wine; or a 43 mL (1.5 oz) shot of 40% strength spirits (note: 1 Canadian standard drink = 17.05 mL or 13.45 g of ethanol).</p>	

The following implementation considerations were noted by members of the expert advisory panel.

## Module 5b Implementation Considerations

### General considerations

#### *Behaviour and lifestyle modification*

- Where required, behaviour and lifestyle modification should be made available, at no cost, to all patients and caregivers. Lifestyle behaviours that should be monitored include:
  - eating/nutrition counselling and modification
  - weight control
  - exercise
  - smoking cessation
  - alcohol restriction
  - sodium intake
  - stress reduction
  - sleep modification therapy
- Behaviour modification/lifestyle therapies should be delivered by a health care professional with skills and training in behaviour modification

#### *Screening tool*

- A validated screening tool for sleep apnea should be developed and implemented

#### *Discharge for TIA*

- Customized discharge packages for patients with TIA or minor (nondisabling) stroke not admitted to hospital or going to stroke rehabilitation should be developed and include the following:
  - results of the clinical assessment, including test results and any consultations with a rehabilitation team (including physiotherapy, occupational therapy, speech-language pathologist) from same-day assessments
  - final clinical diagnosis, including the cause of TIA/minor stroke (if determined at that time point)
  - specific treatments provided and recommended, including prescriptions for stroke-prevention medications
  - nutrition counselling
  - other interventions and follow-up appointments planned
  - stroke-prevention educational materials

A checklist approach customized to meet individual patient need is recommended. (28) Consideration should be given to referral to social work, outpatient rehabilitation assessment, or the CCAC for additional services where needed

#### *Blood pressure*

- Patients should have their blood pressure monitored at every health care encounter, supplemented by home-based blood pressure monitoring if indicated
- Consider access to no-cost ambulatory blood pressure monitoring

#### *Smoking cessation*

- Smoking-cessation strategies that specifically target stroke patients should be developed and implemented. Targeted smoking-cessation materials and messaging should be emphasized to all patients with a chronic disease; in this patient group it is shown to have a significant, positive, immediate clinical outcome
- NRT should be made a free benefit to any Ontario resident with a health card
- Public health departments should hand out free NRT under the “STOP” program; pharmacies should be permitted to do the same after screening patients
- Smoking-cessation drug therapy should be made available at no cost to all Ontarians with a prescription from a physician or from another health care professional under a medical directive and trained in smoking cessation

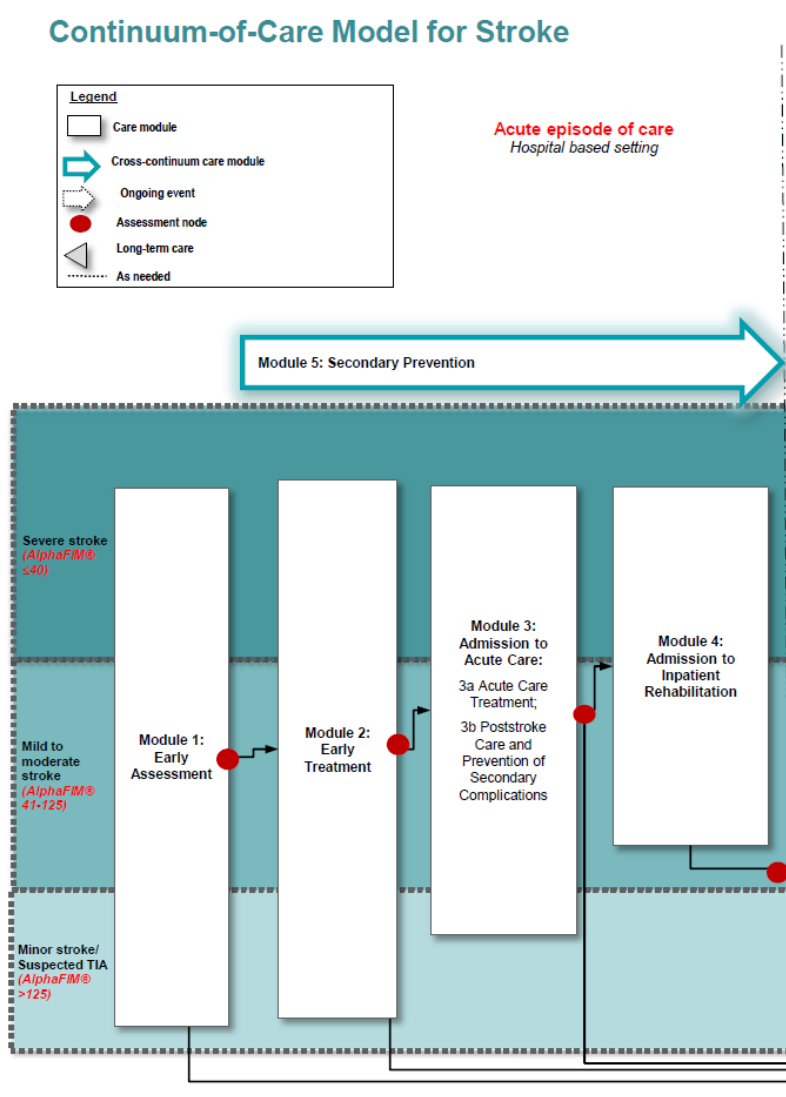
Abbreviations: CCAC, Community Care Access Centre; NRT, nicotine replacement therapy; TIA, transient ischemic attack.

# Recommended Practices for Stroke

Recommendations are presented within their respective modules according to the continuum of care (Figure 7), but they are not necessarily in the order they should be conducted. **Recommendations should be read in full, and not in isolated sections.**

## Acute Episode of Care

Modules 1 through 4 represent the acute episode of care. Module 5 includes recommendations related to secondary prevention that span the stroke continuum of care; some should be initiated during the acute episode of care, and others may be initiated shortly after discharge.



**Figure 7: Acute Episode-of-Care Model for Stroke**

Abbreviations: FIM, Functional Independence Measure; TIA, transient ischemic attack.

## Module 1: Early Assessment

This module identifies best practices for the early assessment of suspected stroke. Patients typically present at the ED, but the same practices should be followed at an outpatient clinic or when patients are directly admitted to acute care. The recommendations emphasize assessing the patient to inform clinical decision-making and determine the most appropriate pathway.

Module 1 Recommended Practices	Contributing Sources of Evidence
<b>1.1 Initial evaluation</b>	
1.1.1 Rapid initial evaluation should be conducted for airway, breathing, and circulation	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation; level B evidence) and Australia (level C evidence)
<b>1.2 Initial examinations</b>	
1.2.1 All patients should undergo a neurological examination to determine focal neurological deficits and assess stroke severity on a standardized stroke scale (NIHSS or CNS for stroke)	Based on CSBPR (level B evidence)
1.2.2 Patients presenting with potentially disabling, acute neurological symptoms suggestive of an acute stroke within 6.0 hours of symptom onset, and may be considered for those in whom treatment can be initiated within a 12- hour window from stroke symptom onset, who meet clinical and imaging criteria may be considered for endovascular therapy	Modified by OSN EVT Working Group consensus Based on CSBPR
1.2.3 All patients with suspected acute stroke (presenting within acute stroke treatment time window) should undergo rapid brain imaging (non-contrast CT or MRI) and CTA (Door to CT/CTA should be less than twenty five minutes)	Based on CSBPR (level A evidence); consistent with SIGN (level A recommendation), AHA/ASA (class I, level B recommendation), NHS/NICE (level 4 evidence), and Australia (level A evidence) Modified by OSN EVT Working Group Consensus
1.2.4. For patients with acute ischemic stroke that are clinically eligible for acute stroke treatments, advanced CT imaging including CT and multiphase CTA or Perfusion CT should be considered.	Based on CSBPR (Level B evidence); Hermes Modified by OSN EVT Working Group
1.2.5 Brain imaging should be interpreted immediately by a health care provider with expertise in reading/interpreting CT/CTA and/or MRI of the brain	Based on AHA/ASA (class I, level C evidence); modified by expert advisory panel consensus Modified by OSN EVT Working Group Consensus
1.2.6 All patients should undergo ECG to detect atrial fibrillation and other acute arrhythmias but should not delay acute treatment	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation, level B evidence) and Australia (level GPP evidence) Modified by OSN EVT Working Group Consensus
1.2.7 A chest x-ray should not delay assessment for thrombolysis	Taken from CSBPR (level C evidence); modified by expert advisory panel consensus
1.2.8 All patients should have the following blood work: <ul style="list-style-type: none"> <li>• CBC</li> <li>• electrolytes</li> <li>• creatinine</li> <li>• glucose</li> <li>• INR</li> <li>• partial thromboplastin time</li> <li>• troponin test (if clinically indicated)</li> </ul>	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level C recommendation), AHA/ASA (class I recommendation, level B and C evidence), and Australia (level GPP evidence)
<b>1.3 Assessment and early management of dysphagia</b>	
1.3.1 All patients with stroke should be made NPO initially and have their swallowing ability screened using a simple, valid, reliable, bedside testing protocol as part of their initial assessment and before initiating	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation, level B evidence) and Australia (level B evidence)

Module 1 Recommended Practices	Contributing Sources of Evidence
oral medication, fluid, or food	
1.3.2 All patients with stroke who are not alert within the first 24 hours should be monitored closely, and swallowing ability should be screened when clinically appropriate	Based on CSBPR (level C evidence); consistent with Australia (level GPP evidence)
1.3.3 Patients with stroke presenting with features indicating dysphagia or pulmonary aspiration should receive a full clinical assessment of their swallowing ability by a speech-language pathologist or appropriately trained specialist who would advise on swallowing ability and the required consistency of diet and fluids	Based on CSBPR (level B evidence)
<b>1.4 Cross-continuum prevention assessment and therapies</b>	
1.4.1 All patients, whether admitted to hospital or discharged from the ED, should be given appropriate cross-continuum secondary prevention assessments and therapies (Modules 5 and 10)	Based on expert advisory panel consensus
<b>1.5 Recommendation is not applicable to ischemic or ICH stroke patients</b>	
<b>1.6 Initial examinations for ischemic stroke</b>	
1.6.1 Recommendation is not applicable to ischemic stroke patients	
1.6.2 All other patients (presenting beyond 48 hours) with a TIA or ischemic stroke should undergo vascular imaging of the brain and neck arteries as soon as possible	Based on CSBPR (level B evidence)
<b>1.7 Initial examinations for ICH</b>	
1.7.1 Patients with ICH must be treated as a medical emergency. ICH should be promptly recognized, and patients should be evaluated immediately by physicians with expertise in stroke management	Based on CSBPR (level A evidence)
1.7.2 Evaluation of patients with acute ICH should include questions about anticoagulant therapy, measurement of platelet count, PTT, and INR	Based on CSBPR (level A evidence); consistent with NHS/NICE (level 3 evidence) and Australia (level D evidence)
1.7.3 Select patients with ICH should have CTA or MRA as soon as possible	Based on CSBPR (level B evidence); modified by expert advisory panel consensus
Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CBC, complete blood count; CSBPR, Canadian Stroke Best Practices Recommendations; CNS, Canadian Neurological Scale; CT, computerized tomography; CTA, computed tomography angiography; ECG, electrocardiogram; ED, emergency department; EVT, Endovascular Treatment ICH, intracerebral hemorrhage; INR, international normalized ratio; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging; NHS/NICE, National Collaborating Centre for Chronic Conditions; NIHSS, National Institute of Health Stroke Scale; NPO, <i>nil per os</i> (nothing by mouth); PTT, partial thromboplastin time; SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 1 Implementation Considerations
<b>General considerations</b> <ul style="list-style-type: none"> <li>Development and/or updating of ED acute stroke protocols to ensure communication with CritiCall Ontario as soon as possible to determine treatment and transport decisions for patients presenting with potentially disabling, acute neurological symptoms suggestive of an acute stroke within 6.0 hours of symptom onset and considered to be a potential candidate for intravenous thrombolysis and/or endovascular therapy (EVT)</li> <li>Regional planning for access to acute stroke EVT should consider the following: <ul style="list-style-type: none"> <li>The importance of rapid triage, assessment and brain imaging (including parallel vascular imaging) of acute stroke patients who are potential candidates for EVT.</li> <li>Development of regional and provincial bypass and repatriation agreements</li> <li>Sites should establish rapid communication protocols with closest EVT site(s), facilitated through CritiCall Ontario.</li> <li>Development of regional protocols to support a “drip and ship” process.</li> </ul> </li> <li>Capacity Planning is needed to develop access to EVT for patients living within regions where currently there is a greater than two (2) hour patient transfer time to an EVT Centre</li> <li>Where feasible, development of processes and protocols to facilitate EMS to divert patients to regional or district stroke and /Endovascular Treatment centres if there is suspicion of stroke</li> <li>The process for EMS prenotification of the receiving stroke hospital about a stroke patient arrival should be better</li> </ul>

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established to ensure acute stroke teams receive timely and detailed information

- Collaboration between local EMS and institutions that provide stroke services should occur in all stroke networks across the province to support quality improvement initiatives that facilitate access to stroke care
- Ongoing education should be provided to EMS crews about the recognition of stroke symptoms and regional medical redirect protocols, including time sensitive treatments such as thrombolysis, EVT, patient transport monitoring and management.
- Upon receiving EMS prenotification, the receiving hospital's acute stroke team should be contacted and called to the ED (for appropriate patients)
- Standardized stroke assessment and treatment protocols/tools should be developed and used in all Ontario hospital EDs
- Access should be increased in all hospitals to either stroke physician experts or radiologists who can interpret brain imaging urgently and allow for full assessment and treatment with tPA thrombolysis within target door to needle time of less than 60 minutes in 90% of treated patients and a median door to needle time of 30 mins. of patient arrival for appropriate patients
- Sufficient human resources capacity should be ensured so that patients can be diagnosed and treated in a timely manner
- To facilitate early assessment, hospital-level CTAS I or CTAS II access to diagnostic imaging should be established for suspected stroke patients
- Rapid turnaround times for lab work should be negotiated in hospitals that provide tPA thrombolysis for ischemic stroke patients to facilitate rapid assessment and treatment
- Efforts to raise public awareness about the symptoms of stroke and when to contact 911 should continue to be enhanced and funded
- Capacity planning to ensure access to CT/CTA should include:
  - Training for CT technologists
  - Adoption of provincial CT/CTA Protocol
  - Human resource availability
  - Communication processes with EVT Centre experts

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Abbreviations: CTAS, Canadian Triage and Acuity Scale; ED, emergency department; EMS, emergency medical services; tPA, tissue plasminogen activator.

## Module 2: Early Treatment

This module identifies best practices for the ED treatment of ischemic and ICH stroke. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

Module 2 Recommended Practices	Contributing Sources of Evidence
<b>2.1 Glucose management</b>	
2.1.1 Hypoglycemia should be corrected immediately	Based on CSBPR (level B evidence)
2.1.2 Blood glucose measurement should be repeated if the first random glucose value is > 11 mmol/L	Based on CSBPR (level C evidence); consistent with NHS/NICE (level 1++ evidence) and Australia (level C evidence)
<b>2.2 Body temperature</b>	
2.2.1 Temperature should be evaluated as part of routine vital signs every 4 hours for first 48 hours	Based on CSBPR (level C evidence); consistent with SIGN (level C recommendation) and AHA/ASA (class I, level C evidence)
For temperature > 37.5 C:	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level C recommendation) and AHA/ASA (class I, level C evidence)
<ul style="list-style-type: none"> <li>• initiate temperature-reducing measures</li> <li>• investigate potential infection</li> <li>• initiate antipyretic and antimicrobial therapy as required</li> </ul>	
<b>2.3 Cross-continuum prevention assessment and therapies</b>	
2.3.1 All patients, whether admitted to hospital or discharged, should be given appropriate cross-continuum secondary prevention assessments and therapies (Modules 5 and 10)	Based on expert advisory panel consensus
<b>2.4 Recommendations are not applicable to ischemic or ICH stroke patients</b>	
<b>2.5 Ischemic stroke patients who are tPA-eligible</b>	
2.5.1 All patients with acute ischemic stroke who can be treated within 4.5 hours of symptom onset (based on the time where the patient was last known to be well, or the time of witnessed onset of stroke) should be evaluated without delay to determine their eligibility for treatment with intravenous tPA (Alteplase)	Based on CSBPR (level A evidence); consistent with SIGN (level A recommendation) and Australia (level A evidence)
2.5.2 All eligible patients should receive intravenous tPA (Alteplase) as soon as possible after hospital arrival with a target door-to-needle time of < 60 minutes in 90% of treated patients and a median door to needle time of 30 mins <i>The expert advisory panel requested that HQO conduct a review to determine if the 60 minute target door-to-needle time, which is current practice, was appropriate or should be shortened. The rapid review concluded that there was no evidence from published studies; therefore, the expert advisory panel recommended that a field evaluation using currently available administrative data be considered, and the above recommendation be followed in the meantime</i>	Based on expert advisory panel consensus in consideration of <a href="#">Effect of a 60-Minute Door-to-Needle Tissue Plasminogen Activator on Stroke Disability: A Rapid Review</a> , which concluded that no studies were identified; consistent with CSBPR (level B evidence), AHA/ASA (class 1 level B evidence), and expert advisory panel consensus
2.5.3 Administration of intravenous tPA (Alteplase) should follow the American Stroke Association guidelines: total dose 0.9 mg/kg up to a maximum of 90 mg, with 10% (0.09 mg/kg) given as intravenous bolus over 1 minute and the remaining 90% (0.81 mg/kg) given as an intravenous infusion over 60 minutes	Based on CSBPR (level A evidence); consistent with SIGN (level A recommendation), AHA/ASA (class I, level A evidence), and Australia (level A evidence)
2.5.4 Ischemic stroke patients receiving tPA with very high blood pressure (> 185/110 mm Hg) should be treated to < 185/105 mm Hg to reduce the risk of secondary intracranial hemorrhage	Based on CSBPR (level B evidence)

Module 2 Recommended Practices	Contributing Sources of Evidence
2.5.5 For patients with stroke who are treated with tPA, antiplatelets or anticoagulants should not be used during the first 24 hours post-thrombolysis and until repeat brain imaging (CT/MRI) has excluded intracranial hemorrhage	Based on CSBPR (level A evidence)
2.5.6 Ongoing acute care admission, tPA patients should be admitted to a stroke unit as per the Ontario definition A geographical unit with identifiable co-located beds (eg 5A -7, 5A-8, 5A-9, 5A-10, 5A-11) that are occupied by stroke patients 75% of the time and has a dedicated inter-professional team with expertise in stroke care with the following professionals at a minimum nursing, physiotherapy, occupational therapy, speech language pathologist"	Based upon CSBPR 2015 ( Evidence level A) and modified by the OSN
<b>2.6 Ischemic Stroke patients who are eligible for EVT</b>	
2.6.1 Patients presenting with neurological symptoms suggestive of an acute stroke within 6.0 hours of symptom onset, in whom treatment can be initiated within a 12- hour window from symptom onset and meet clinical and imaging criteria should be considered for endovascular therapy	Based on CSBPR 2015 ( evidence Level B)and Modified by the OSN EVT Working Group
2.6.2 EVT is indicated in patients based upon imaging selection with noncontrast CT head and CTA, supplemented by multiphase CTA or CT Perfusion	Based upon CSBPR 2015 (evidence level A) and modified by the OSN EVT Working Group
2.6.3 Imaging criteria for EVT include: -a small to moderate ischemic core defined by an ASPECTS score of greater than or equal to 6 on non-contrast CT - an occluded proximal intracranial artery of the anterior circulation, which is a target lesion amenable to EVT - evidence of moderate-to-good collateral circulation evidenced by multiphase CTA or CT Perfusion	Based upon CSBPR 2015 ( Evidence Level A) and modified by the OSN EVT Working Group
2.6.4 EVT is indicated in patients who have received intravenous tPA and those who are not eligible for intravenous tPA	Based upon CSBPR 2015 (Evidence Level A)
2.6.5 EVT Centre Criteria- see Appendix A Endovascular Treatment should be offered within a coordinated system of care including bypass agreements with EMS; access to rapid neuro imaging ( CT and CTA, preferably multiphase CTA); coordination with local and referring ED, the stroke team and radiology; expertise in neurointervention as outlined in International and Canadian Training Guidelines; and access to a stroke unit for ongoing management	Based on CSBPR 2015 ( Evidence level A) and modified by the OSN EVT Working group
2.6.6 Post EVT care: Patients should be admitted to a designated critical care/Step down and/or Stroke Unit with monitoring capabilities and protocols in place that follow current evidence based-stroke best practice recommendations	Based upon CSBPR 2015 (Evidence level A) and modified by the OSN EVT Working Group
2.6.7 Ongoing acute care admission, EVT patients should be admitted to a stroke unit as per the Ontario definition A geographical unit with identifiable co-located beds (eg 5A -7, 5A-8, 5A-9, 5A-10, 5A-11) that are occupied by stroke patients 75% of the time and has a dedicated inter-professional team with expertise in stroke care with the following professionals at a minimum nursing, physiotherapy, occupational therapy, speech language pathologist"	Based upon CSBPR 2015 (Evidence level A) and modified by the OSN
<b>2.7 Admitting patients with ICH to hospital</b>	
2.7.1 All patients with acute ICH should be admitted to hospital to monitor for early deterioration	Based on expert advisory panel consensus

Module 2 Recommended Practices	Contributing Sources of Evidence
<b>2.8 Coagulopathy for ICH</b>	
2.8.1 Patients with acute ICH and established coagulopathy or a history of anticoagulant use with warfarin should be treated urgently to reverse the anticoagulation due to warfarin (prothrombin complex concentrate + vitamin K 10 mg IV x 1 dose)	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level B recommendation), NHS/NICE (level 3 evidence), and Australia (level B evidence)
<b>2.9 Neurosurgical evaluation for ICH</b>	
2.9.1 The majority of patients with acute supratentorial ICH do not require neurosurgical evaluation; however, select patients with supratentorial ICH and all patients with posterior fossa ICH require neurosurgical consultation	Based on CSBPR (level B evidence); modified by expert advisory panel consensus
Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practices Recommendations; CT, computed topography; HQO, Health Quality Ontario; ICH, intracerebral hemorrhage; IV, intravenous; MRI, magnetic resonance imaging; NHS/NICE, National Collaborating Centre for Chronic Conditions; SIGN, Scottish Intercollegiate Guidelines Network; tPA, tissue plasminogen activator.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 2 Implementation Considerations
<b>General considerations</b>
<ul style="list-style-type: none"> <li>Capacity planning should include strategies to ensure neurointerventional expertise as recommended (see Ontario EVT Centre Criteria)</li> <li>For EVT Centres, door to arterial access – median 60 minutes, first CT scan (first slice) to arterial access – median &lt; 45 minutes, door to final reperfusion – median 90 minutes</li> <li>Capacity Planning is needed to develop access to EVT for patients living within regions where currently there is a greater than two (2) hour patient transfer time to an EVT Centre</li> <li>In EDs of hospitals that provide acute stroke services, standardized protocols should be established (in collaboration with regional stroke networks) to ensure a coordinated and efficient approach and to facilitate delivery of tPA and/or transfer to an EVT centre</li> <li>Standardized priority protocols should be established for all suspected stroke patients to receive treatment as soon as possible and be admitted to a stroke unit within the first few hours after presenting to an ED</li> <li>Standardized protocols should also be established to ensure a coordinated and efficient approach to telestroke service delivery to facilitate delivery of tPA in referring sites and/or consultation for eligibility for transport for EVT</li> <li>Hospitals should have ready access to rectal ASA</li> </ul>
Abbreviations: ASA, acetylsalicylic acid; CIHI, Canadian Institute for Health Information; ED, emergency department; tPA, tissue plasminogen activator.

## Module 3: Admission to Acute Care

This module identifies best practices for acute inpatient admissions. To optimize outcomes and efficiencies, stroke volumes should be at least 165 ischemic stroke patients per year, per institution; greater volumes are likely to confer additional benefits (based on an analysis of the Discharge Abstract Database, 2002–2009). (58) The appropriate critical mass for an integrated stroke unit (a specialized inpatient stroke unit that provides both acute and rehabilitation interventions) has not been determined. The Ontario Stroke Network revised the definition of a stroke unit “A geographical unit with identifiable co-located beds (eg 5A -7, 5A-8, 5A-9, 5A-10, 5A-11) that are occupied by stroke patients 75% of the time and has a dedicated inter-professional team with expertise in stroke care with the following professionals at a minimum nursing, physiotherapy, occupational therapy, speech language pathologist”). Ontario Stroke Network 2015

Module 3a provides recommendations for acute inpatient treatment, and Module 3b provides recommendations for the prevention of secondary complications, which should be initiated in the acute care setting but also be considered as ongoing activities. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

### Module 3a: Acute Care Treatment

Module 3a Recommended Practices	Contributing Sources of Evidence
<b>3.1 Stroke units</b>	
3.1.1 All patients should be admitted to a specialized, geographically defined hospital unit dedicated to the management of stroke patients as described per the OSN definition: <ul style="list-style-type: none"><li>Geographical unit with identifiable co-located beds that are occupied by stroke patients 75% of the time and have a dedicated interprofessional team with expertise in stroke care with the following professionals at a minimum nursing, physiotherapy, occupational therapy, speech language pathologist</li></ul>	Based on an HQO special report (53) (moderate quality evidence) persons admitted to a stroke unit had a significant reduction in death and the combined outcome of death or institutionalization, and a nonsignificant reduction in institutionalization. Low quality evidence showed that patients admitted to a stroke unit had a significant reduction in the combined outcome of death or dependency and length of hospital stay and a nonsignificant reduction in the outcome of dependency; consistent with CSBPR (level A evidence), SIGN (level A recommendation), and Australia (level C evidence) Ontario Stroke Network
3.1.2 The core stroke unit team should consist of health care professionals with stroke expertise in medicine, nursing, occupational therapy, physiotherapy, speech-language pathology, social work, and clinical nutrition (a dietitian)	Based on CSBPR (level A evidence); consistent with Australia (level A evidence)
3.1.3 To have the necessary stroke expertise, core stroke unit team members should be individuals who spend the vast majority of their time treating stroke patients and regularly complete education about stroke care	Based on CSBPR (no level of evidence provided); consistent expert advisory panel consensus
3.1.4 Patients should have access to a specialized interprofessional team 7 days a week	Based on expert advisory panel consensus
3.1.5 Physiotherapy, speech-language pathology, and occupational therapy team members should assess stroke patients within 48 hours of admission to hospital and formulate a management plan	Based on CSBPR (level B evidence); modified by expert advisory panel consensus
<b>3.2 Early mobilization</b>	

Module 3a Recommended Practices	Contributing Sources of Evidence
<p>3.2.1</p> <p>All stroke patients admitted to hospital with acute stroke should be mobilized early (between 24 hours and 48 hours of stroke onset), unless contraindicated</p> <p>Frequent out-of-bed activity in the very early time frame (within 24 hours of stroke onset) is not recommended. Mobilization may be reasonable for some patients with acute stroke in the very early time frame and clinical judgement should be used.</p>	<p>Based on CSBPR (level B evidence); consistent with SIGN (level A recommendation) and Australia (level B evidence)</p>
<b>3.3 Assessment</b>	
3.3.1 Clinicians should use standardized, valid assessment tools to evaluate patients' stroke-related impairments and functional status	Based on CSBPR (level of evidence B); consistent with SIGN (level C recommendation)
3.3.2 AlphaFIM should be completed on or by day 3 after admission (target day 3, admission day is day 1)	Based on expert advisory panel consensus in reference to the OSN Stroke Reference Group
3.3.3 All stroke patients should be assessed for risk of developing venous thromboembolism	Based on CSBPR (level of evidence not provided)
3.3.4 Early mobilization and adequate hydration should be encouraged for all acute stroke patients to help prevent venous thromboembolism	Based on CSBPR (level C evidence)
3.3.5 The nutrition and hydration status of stroke patients should be assessed within the first 48 hours of admission using a valid screening tool. Stroke patients with nutritional concerns, hydration deficits, dysphagia, or other comorbidities should be referred to a dietitian. Referral to a dietitian should be made within 7 days of admission for recommendations and for consideration of enteral nutrition support for patients who are unable to meet nutritional and fluid requirements	Based on CSBPR (level B evidence); consistent with SIGN (levels A-C recommendations) and AHA/ASA (class III, level B evidence)
<b>3.4 Length of stay</b>	
<p>3.4.1 The recommended length of stay:</p> <ul style="list-style-type: none"> <li>• 5 days for patients with ischemic stroke</li> <li>• 7 days for patients with ICH</li> </ul>	Based on expert advisory panel consensus in reference to the OSN Stroke Reference Group
<b>3.5 Cross-continuum prevention assessment and therapies</b>	
3.5.1 All patients, should be given appropriate cross-continuum secondary prevention assessments and therapies (Modules 5 and 10)	Based on expert advisory panel consensus
<p>Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Best Practices Recommendations; FIM, Functional Independence Measure; HQO, Health Quality Ontario; ICH, intracerebral hemorrhage; OSN, Ontario Stroke Network; SIGN, Scottish Intercollegiate Guidelines Network.</p>	

The following implementation considerations were noted by members of the expert advisory panel.

Module 3a Implementation Considerations
<p><b>General considerations</b></p> <ul style="list-style-type: none"> <li>• All stroke patients should be admitted to a designated specialized hospital with a stroke unit. If a patient arrives at a hospital without a stroke unit, he/she should be transferred to a designated specialized stroke hospital shortly after he/she is stable enough for travel</li> <li>• All hospitals providing stroke care should ensure that the interprofessional stroke team uses standardized, validated assessment tools; where possible, these tools should be in electronic format linked to the EHR</li> <li>• Patients should be screened/assessed for diabetes, dental issues, cognitive impairment, and depression upon admission to hospital</li> <li>• Smoking-cessation education, drug therapy and counselling should be made available while patients are in the hospital, and patients should be referred to community-based smoking-cessation program on discharge</li> <li>• To ensure that patient and caregiver education and emotional support are in place, follow-up care should be booked in a timely manner and discharge planning should begin shortly after admission</li> <li>• Hospitals should make access to a stroke unit or neuro/intensive care unit with the support of an interprofessional stroke team</li> <li>• Hospital should ensure adequate staffing 7 days per week (e.g., patient-to-physiotherapist ratio of 1:6) of rehabilitation</li> </ul>

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specialists (physiotherapy, occupational therapy, speech-language therapy, social work etc.)

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Abbreviation: EHR, electronic health record.

## Module 3b: Secondary Prevention in Acute Episode of Care

Module 3b Recommended Practices	Contributing Sources of Evidence
<b>3.6 Screening and management of comorbid conditions</b>	
<b>Diabetes</b>	
3.6.1 Screening and management of diabetes should be conducted in accordance with Canadian Diabetes Association guidance, available at: <a href="http://www.diabetes.ca/">http://www.diabetes.ca/</a>	Based on expert advisory panel consensus
<b>Smoking</b>	
3.6.2 The expert advisory panel recommends that the following OHTAC recommendation for smoking cessation among COPD patients (54) be considered for stroke patients as well: <ul style="list-style-type: none"> <li>OHTAC strongly endorses evidence-based strategies aimed at encouraging smoking cessation in patients with COPD</li> <li>Intensive counselling (≥ 90 minutes) is the most effective and cost-effective strategy, and should continue to be encouraged</li> <li>OHTAC recommends that consideration be made to providing training programs to health care professionals involved in providing intensive counselling</li> <li>OHTAC recommends bupropion or nicotine replacement therapies for smoking cessation. (Building on this OHTAC recommendation, all smokers should be considered for cessation medications [e.g., NRT, bupropion, varenicline, as appropriate] to aid in maximizing quit rates, unless contraindicated]</li> </ul>	Based on expert advisory panel consensus in consideration of the HQO Smoking Cessation for Patients with Chronic Obstructive Pulmonary Disease: An Evidence-Based Analysis (62) and related OHTAC recommendation (very low to moderate quality of evidence); consistent with CSBPR (level B evidence), SIGN (level B evidence), and Australia (level A evidence)
	Consistent with the HQO Clinical Handbook for COPD
<b>Venous thromboembolism</b>	
3.6.3 Stroke patients at high risk for venous thromboembolism should be started on pharmacological venous thromboembolism prophylaxis after brain imaging has ruled out ICH: <ul style="list-style-type: none"> <li>subcutaneous low molecular weight heparin should be considered for most patients with ischemic stroke</li> <li>subcutaneous unfractionated heparin should be considered for patients with renal failure</li> </ul>	Based on CSBPR (level A evidence)
	Based on CSBPR (level B evidence)
3.6.4 Intermittent pneumatic compression devices should be used in patients who are at high risk for venous thromboembolism but have a contraindication to pharmacological thromboembolism prophylaxis such as active systemic bleeding or high risk of bleeding	Based on expert advisory panel consensus
3.6.5 The use of antiembolic (compression) stockings for poststroke venous thromboembolism prophylaxis is not recommended	Based on CSBPR (level A evidence)
<b>Depression</b>	
3.6.6 Patients should be screened for depression using a validated tool, especially if there is a history or evidence of symptoms of depression or mood change. All patients with stroke should be screened to determine if they have a history of or risk factors for depression	Based on CSBPR (level A evidence)
3.6.7 Patients identified at risk for depression during screening should be referred to a health care professional with expertise in diagnosis and management of depression	Based on CSBPR (level B evidence)
3.6.8 Screening should take place at various points along the episode of care including during the inpatient hospital admission, early on during rehabilitation and before discharge to the community, and whenever clinical presentations occur	Based on expert advisory panel consensus
<b>Incontinence</b>	
3.6.9 All stroke patients should be screened for urinary incontinence and retention, fecal incontinence, and constipation	Based on CSBPR (level C evidence)

Module 3b Recommended Practices	Contributing Sources of Evidence
3.6.10 A portable ultrasound should be used as the preferred noninvasive painless method for assessing postvoid residual urine volume in the bladder	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
3.6.11 Indwelling catheters should be avoided due to the risk of urinary tract infection. If used, indwelling catheters should be assessed daily and removed as soon as possible	Based on CSBPR (level A evidence); consistent with AHA/ASA (class III, level C evidence)
3.6.12 A bladder-training program should be implemented in patients with urinary incontinence	Based on CSBPR (level C evidence)
3.6.13 A bladder-training program should include timed and prompted toileting on a consistent schedule	Based on CSBPR (level B evidence)
3.6.14 A bowel-management program should be implemented for stroke patients with persistent constipation or bowel incontinence	Based on CSBPR (level A evidence)
<b>Oral/dental</b>	
3.6.15 All stroke patients should have an oral/dental assessment, including screening for signs of dental disease, level of oral care, and appliances. An appropriate oral care protocol should be used for every patient, including those who use dentures	Based on CSBPR (level C evidence)
3.6.16 The oral care protocol should be consistent with the Canadian Dental Association recommendations, (65) which are currently: <ul style="list-style-type: none"> <li>• frequency of oral care (<math>\geq</math> twice/day)</li> <li>• types of oral care products (toothpaste, floss, and mouthwash)</li> <li>• management for patients with dysphagia</li> </ul>	Based on CSBPR (level B evidence)
<b>Cognitive impairment</b>	
3.6.17 All stroke patients with vascular risk factors and clinically evident stroke should be considered at high risk for vascular cognitive impairment	Based on CSBPR (level B evidence)
3.6.18 All high-risk patients should be screened for cognitive impairment using a validated screening tool	Based on CSBPR (level C evidence)
3.6.19 Screening to investigate a person's cognitive status should address arousal, alertness, attention, orientation, memory, language, agnosia, visuospatial/perceptual function, praxis, and executive functions, such as insight, judgment, social cognition, problem-solving, abstract reasoning, initiation, planning, and organization	Based on CSBPR (level C evidence)
3.6.20 The Montreal Cognitive Assessment is recommended when vascular cognitive impairment is suspected, as it is considered more sensitive than the Mini-Mental State Exam in these patients	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
3.6.21 Patients with identified cognitive impairments should receive additional cognitive or neuropsychological assessments to guide management	Based on CSBPR (level B evidence)
<b>3.7 Falls prevention</b>	
3.7.1 All patients with stroke should be screened at admission for risk of falls by an experienced clinician	Based on CSBPR (level C evidence)
3.7.2 A falls risk assessment should include comprehensive interprofessional assessment of medical functional history and examination of mobility, vision, perception, cognition, and cardiovascular status	Based on CSBPR (level B evidence)
3.7.3 Based on assessment, an individualized falls-prevention strategy should be implemented	Based on CSBPR (level C evidence)
<b>3.8 Patient and family education</b>	
3.8.1 Patients, families, and caregivers should be prepared for transitions between care environments through education and training, emotional support, and information related to community services specific to the transition they are undergoing	Based on CSBPR (level B evidence)

Module 3b Recommended Practices	Contributing Sources of Evidence
3.8.2 Patient and family education should occur at all stages of stroke care	Based on CSBPR (level of evidence not provided); consistent with SIGN (level A recommendation)
<b>3.9 Additional prevention therapies for patients with ischemic stroke</b>	
3.9.1 Treatment of hypertension in the setting of acute ischemic stroke should not routinely be undertaken, and should not be aggressively treated until after vascular imaging of the brain and neck arteries	Based on expert advisory panel consensus
<ul style="list-style-type: none"> <li>• Extreme blood pressure elevation (e.g., systolic &gt; 220 mm Hg or diastolic 120 mm Hg) should be treated to reduce blood pressure by approximately 15% initially and not more than 25% over the first 24 hours, with gradual reduction thereafter</li> </ul>	Based on CSBPR (level C evidence); modified by expert advisory panel consensus; consistent with AHA/ASA (class I, level C evidence)
<ul style="list-style-type: none"> <li>• Excessive lowering of blood pressure should be avoided, as this may exacerbate existing ischemic stroke or may induce ischemia, particularly in the setting of intracranial arterial occlusion or extracranial carotid or vertebral artery occlusion</li> </ul>	Based on expert advisory panel consensus
<b>3.10 Additional prevention therapies for patients with ICH</b>	
310.1 Patients presenting with ICH with elevated systolic blood pressure (> 180 mm Hg) should undergo acute lowering of systolic blood pressure to a target of 140 to 160 mm Hg	Based on CSBPR (level C evidence); modified by expert advisory panel consensus; consistent with SIGN (level A recommendation) and Australia (level GPP evidence)
3.10.2 Anticoagulants should be avoided for at least 48 hours after ICH onset	Based on expert advisory panel consensus; consistent with SIGN (level B-D recommendations)
3.10.3 There is insufficient evidence on the safety and efficacy of anticoagulant venous thromboembolism prophylaxis early after ICH. Intermittent pneumatic compression devices should be used while there is active bleeding until pharmacological prophylaxis is deemed safe (at least 48 hours after presentation and confirmation with repeat brain imaging of no further hemorrhage expansion)	Based on expert advisory panel consensus; consistent with SIGN (level B-D recommendations)
Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Best Practices Recommendations; COPD, chronic obstructive pulmonary disease; HQO, Health Quality Ontario; ICH, intracerebral hemorrhage; NRT, nicotine replacement therapy; OHTAC, Ontario Health Technology Advisory Committee; SIGN, Scottish Intercollegiate Guidelines Network.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 3b Implementation Considerations
<b>General considerations</b>
<ul style="list-style-type: none"> <li>• Patients with acute ICH should be admitted to a stroke unit or neuro/intensive care unit and undergo interprofessional stroke team assessment to determine their rehabilitation and other care needs</li> <li>• Hospitals that provide stroke services should ensure that their interprofessional team is skilled at assessing for all comorbid conditions, including neuropsychological issues</li> <li>• Hospitals that provide stroke services should ensure they have sufficient resources for intermittent pneumatic compression devices (including the main unit, sleeves, and tubing) for stroke patients with a contraindication to pharmacological thromboembolism prophylaxis</li> <li>• Hospitals should ensure there is access to level 2 care beds or the intensive care unit for certain stroke patients to provide required monitoring (e.g., hourly blood pressure monitoring for patients post-tPA thrombolysis or with ICH to avoid poststroke complications) and use restricted medications for early poststroke care (e.g., IV antihypertensive agents such as labetalol)</li> <li>• Stroke units should have easy access to a portable bladder scanner for assessment of urinary retention in stroke patients</li> </ul>
Abbreviations: ICH, intracerebral hemorrhage; IV, intravenous; tPA, tissue plasminogen activator.

## Module 4: Admission to Inpatient Rehabilitation

This module identifies best practices for the inpatient rehabilitation of stroke patients. In general, patients who qualify for inpatient rehabilitation are those with an early AlphaFIM score of 40 to 80. Patients with a score of > 80 would typically go to outpatient rehabilitation (Module 9). However, depending on age, availability of a caregiver, severity of cognitive impairment, presence of severe aphasia/dysphagia, and profound inattention/neglect patients may need inpatient rehabilitation. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

Module 4 Recommended Practices	Contributing Sources of Evidence
<b>4.1 Specialized rehabilitation facilities</b>	
4.1.1 All patients who require rehabilitation should be referred to a specialist rehabilitation team in a geographically defined unit as soon as possible after admission	Based on CSBPR (level A evidence); consistent with Australia (level GPP evidence)
4.1.2 Facilities should enable procedures for admission 7 days per week	Based on expert advisory panel consensus in reference to OSN Stroke Reference Group
4.1.3 The interprofessional rehabilitation team should assess patients within 24–48 hours of admission and develop a comprehensive individualized rehabilitation plan that reflects the severity of the stroke and the needs and goals of the stroke patient	Based on CSBPR (level C evidence)
4.1.4 The interprofessional rehabilitation team should consist of physiatrists, other physicians with expertise/core training in stroke rehabilitation, occupational therapists, physical therapists, speech-language pathologists, nurses, social workers and dietitians	Based on CSBPR (level A evidence)
Additional team members would ideally also include recreation therapists, psychologists, vocational therapists, educational therapists and rehabilitation therapy assistants	Based on CSBPR (level C evidence)
4.1.5 Recommended staffing ratios for inpatient rehabilitation are: <ul style="list-style-type: none"> <li>• Physiotherapy/occupational therapy: 1:r 6 inpatient beds</li> <li>• Speech-language pathology: 1:12</li> </ul>	Based on the OSN Stroke Reference Group
4.1.6 Stroke unit teams should conduct at least 1 formal interprofessional meeting per week, at which they: <ul style="list-style-type: none"> <li>• identify patient problems</li> <li>• set rehabilitation goals</li> <li>• monitor patient progress</li> <li>• plan postdischarge support</li> </ul>	Based on CSBPR (level B evidence)
<b>4.2 Assessment</b>	
4.2.1 All patients admitted to hospital with acute stroke should have an initial assessment by rehabilitation professionals as soon as possible, preferably within 24–48 hours of admission	Based on CSBPR (level A evidence)
4.2.2 Clinicians should use standardized valid assessment tools to evaluate the patient's stroke-related impairments	Based on CSBPR (level B evidence)
4.2.3 The FIM tool should be used as a standard assessment tool	Based on expert advisory panel consensus in reference to the OSN Stroke Reference Group
<b>4.3 Rehabilitation therapy</b>	
4.3.1 All patients with stroke should begin rehabilitation therapy within an active and complex stimulating environment	Based on CSBPR (level C evidence)

Module 4 Recommended Practices	Contributing Sources of Evidence
<p>4.3.2 Rehabilitation should begin as early as possible after medical stability is reached</p> <ul style="list-style-type: none"> <li>There is evidence of very low quality that an earlier onset of rehabilitation after stroke (onset of rehabilitation before 14 days) results in increased independency and functionality compared with a later start time for stroke rehabilitation. Until better quality evidence is available, the timing of rehabilitation ought to be initiated as soon as the patient is ready</li> </ul>	Based on <a href="#">Optimal Onset-to-Admission Interval for Inpatient Stroke Rehabilitation: A Rapid Review</a>
<p>4.3.3 Patients with moderate or severe stroke who are rehabilitation-ready and have rehabilitation goals should be given an opportunity to participate in inpatient stroke rehabilitation</p>	Based on expert advisory panel consensus
<p>4.3.4 Stroke patients should receive, via an individualized treatment plan, at least 3 hours of direct task-specific therapy per day by the interprofessional stroke team for at least 6 days per week</p>	Based on CSBPR (level A evidence); modified by expert advisory panel consensus
<p>4.3.5 The following OHTAC recommendations on intensity of rehabilitation (22) should be considered:</p> <ul style="list-style-type: none"> <li>OHTAC recommends that intensive physical therapy be provided to patients when initiated within 6 weeks following an acute stroke to optimize upper-limb motor function recovery and ADLs</li> <li>While no ceiling effect has been established for physical therapy beyond which no further improvement in function is expected, OHTAC recommends at least 1 and up to 2 hours per day for at least 6 weeks</li> </ul>	Based on HQO's Effect of Increased Intensity of Physical Therapy on Patient Outcomes After Stroke: An Evidence-Based Analysis (22) (moderate to high quality of evidence)
<p>4.3.6 Therapy to promote motor and physical recovery should be provided according to best practice recommendations</p>	Based on CSBPR (level of evidence A–C)
<b>4.4 Length of stay</b>	
<p>4.4.1 LOS in rehabilitation should be determined by the benchmarks proposed by the OSN Stroke Reference Group for each RPG:</p> <p>1100 = LOS 48.9 days</p> <p>1110 = LOS 41.8 days</p> <p>1120 = LOS 35.8 days</p> <p>1130 = LOS 25.2 days</p> <p>1140 = LOS 14.7 days</p> <p>1150 = LOS 7.7 days</p> <p>1160 = LOS 0 days</p>	Based on expert advisory panel consensus in reference to the OSN Stroke Reference Group
<b>4.5 Cross-continuum prevention assessment and therapies</b>	
<p>4.5.1 All discharged patients should be given appropriate cross-continuum secondary prevention assessments and therapies (Modules 5 and 10)</p>	Based on expert advisory panel consensus
<p>Abbreviations: ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Best Practices Recommendations; CIMT, constraint-induced movement therapy; FIM, Functional Independence Measure; HQO, Health Quality Ontario; ICES, Institute for Clinical Evaluative Sciences; LOS, length of stay; OHTAC, Ontario Health Technology Advisory Committee; OSN, Ontario Stroke Network; RPG, Rehabilitation Practice Group.</p>	

The following implementation considerations were noted by members of the expert advisory panel.

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#### Module 4 Implementation Considerations

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##### General considerations

- A standardized stratification tool should be used to assess intensity of rehabilitation required
- Patients and caregivers must be informed and educated on therapy options, an agreed-upon therapy plan, and rehabilitation goals
- Hospitals should ensure adequate staffing 7 days per week of rehabilitation specialists (physiotherapy, occupational therapy, speech-language therapy, social work, etc see recommendation 4.1.5) to provide ongoing rehabilitation care and to accept patient admissions from acute care hospitals
- Free-standing rehabilitation hospitals should ensure that care teams have the skills and diagnostic imaging tools to manage nasogastric tubes, to support the timely transfer of otherwise medically stable patients to rehabilitation from acute care within the recommended time frames (acute care LOS 5 days for ischemic stroke and 7 days for ICH)
- If nasogastric tubes are required for more than 7 days, rehabilitation teams require timely access to insertion of gastrostomy or duodenostomy feeding tubes
- Patients with an AlphaFIM score of >80 should be discharged to outpatient rehabilitation
- Patients should have access to rehabilitation programs 7 days a week and in the evenings
- A standardized definition of the intensity of therapy has been developed and data collection within the NRS is mandatory

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Abbreviations: FIM, Functional Independence Measure; ICH, intracerebral hemorrhage; LOS, length of stay.

## Module 5: Secondary Prevention

This module identifies best practices for secondary prevention assessments and therapies. All activities should begin before discharge or shortly thereafter. Some activities are intended to begin in the acute episode of care (Module 5a), while others may begin immediately after discharge (Module 5b). This module is split into 2 sections to highlight these differences, but it should be seen as a continuum across the episodes of care.

### *Module 5a: Secondary Prevention in Acute Episode of Care*

Module 5a Recommended Practices	Contributing Sources of Evidence
<b>5.1 Secondary prevention assessments and therapies</b>	
5.1.1 In patients with no identified stroke etiology (e.g., large artery atherosclerotic disease of the carotid arteries), echocardiography (either 2-D or transesophageal) should be completed for those with suspected embolic stroke and normal neurovascular imaging, as well as no absolute contraindications for anticoagulant therapy	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level B recommendation)
5.1.2 Serial ECGs (i.e., daily) should be done for the first 72 hours poststroke to detect atrial fibrillation and other acute arrhythmias	Based on CSBPR (level B evidence)
<ul style="list-style-type: none"><li>For patients with TIA or embolic stroke without an identified etiology and where the serial ECGs in hospital are negative for atrial fibrillation, ambulatory holter cardiac monitoring should be completed (at least 48 hours, and repeated if the initial monitor is negative, or 14- to 30-day monitors should be considered)</li></ul>	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.3 If hypercoagulability or vasculitis is suspected in young stroke patients (< 45 years old), they should be referred to a stroke specialist while in hospital for early evaluation and management and then to a stroke-prevention clinic or stroke specialist in the community for ongoing management	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.4 For patients with suspected vasculitis, the following blood work is recommended (with referral to rheumatology for further guidance): <ul style="list-style-type: none"><li>erythrocyte sedimentation rate</li><li>C-reactive protein</li><li>antinuclear antibody</li><li>syphilis screen</li></ul>	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.5 A statin should be prescribed to most patients to achieve LDL cholesterol < 2.0 mmol/L or a 50% reduction in LDL cholesterol from baseline	Based on CSBPR (level B evidence); consistent with SIGN (level A recommendation) and Australia (level B evidence)
5.1.6 For patients with suspected hypercoagulability and no evident cause of stroke, the following blood work should be considered (but only done > 3 months poststroke): <ul style="list-style-type: none"><li>antiphospholipid antibody</li><li>lupus anticoagulant</li><li>protein S</li><li>protein C</li><li>antithrombin III</li><li>prothrombin gene mutation</li><li>factor V Leiden mutation</li></ul>	Based on CSBPR (level C evidence); modified by expert advisory panel consensus
5.1.7 Patients with ipsilateral 50%–99% internal carotid artery stenosis should be evaluated by a stroke expert. Selected patients should be offered carotid endarterectomy with the goal of surgery within 14 days of the incident event and once the patient is clinically stable	Based on CSBPR (level A evidence); consistent with SIGN (level A recommendation) and NHS/NICE (level 1++ evidence)
5.1.8 Patients should be prescribed antiplatelet therapy for secondary prevention of recurrent stroke, unless there is an indication for anticoagulation	Based on CSBPR (level A evidence)

Module 5a Recommended Practices	Contributing Sources of Evidence
<b>5.2 Recommendations are not applicable to ischemic and ICH stroke patients</b>	
<b>5.3 Additional recommendation for patients with ischemic stroke</b>	
5.3.1 Patients with ischemic stroke and atrial fibrillation should be started on anticoagulant therapy within 14 days of the incident event, the timing to be determined based on clinical judgment, the size of the infarction, any secondary hemorrhage, and other clinical factors. Before starting an anticoagulant, brain imaging should be done to ensure stability of the stroke and no new hemorrhage. Anticoagulation should be with dabigatran, rivaroxaban, apixaban, or warfarin	Based on CSBPR (level B evidence); modified by expert advisory panel consensus
Abbreviations: Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Best Practices Recommendations; ECG, electrocardiogram; ICH, intracerebral hemorrhage; LDL, low-density lipoprotein; NHS/NICE, National Collaborating Centre for Chronic Conditions; SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack.	

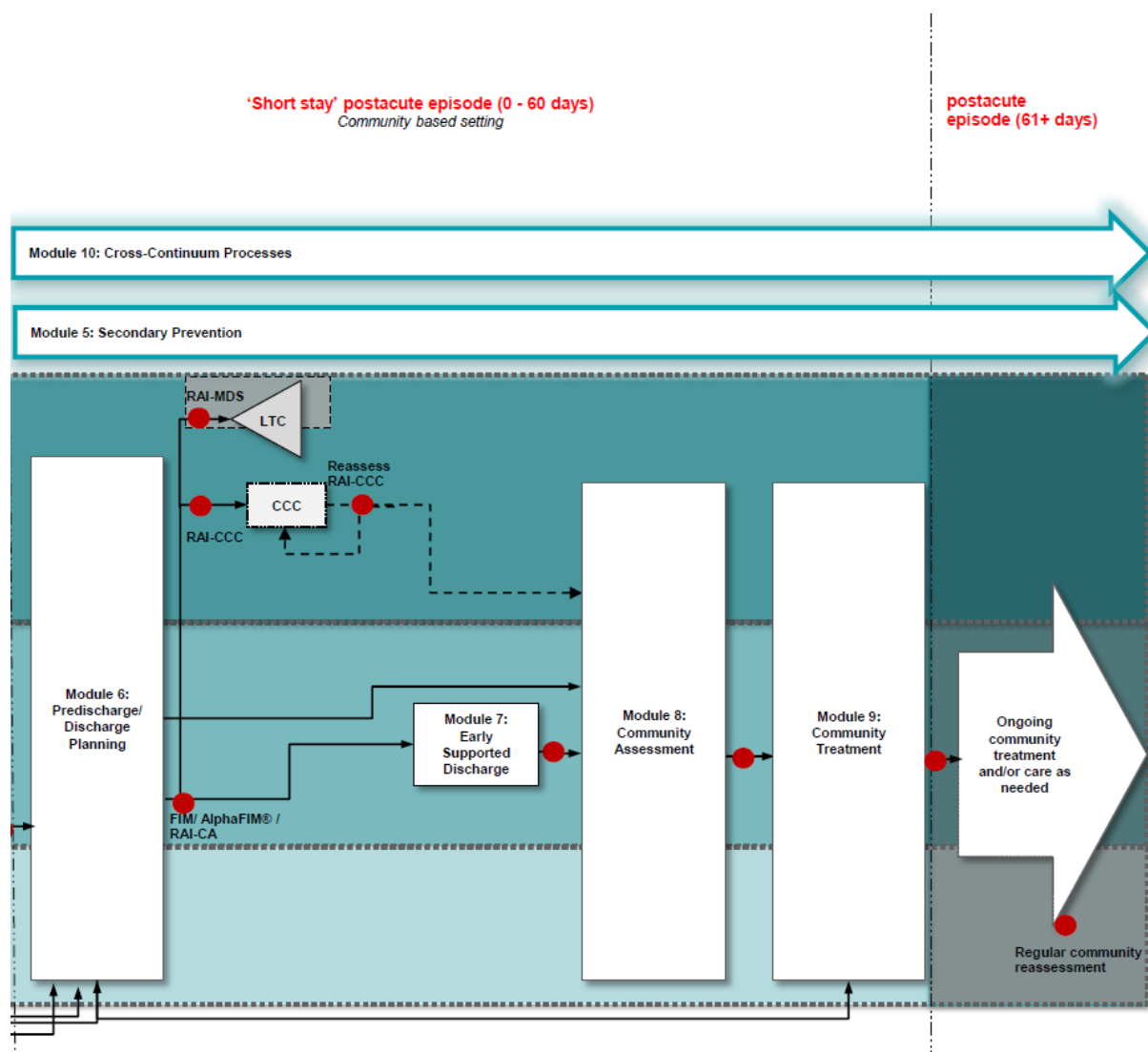
No implementation considerations were identified by the expert advisory panel for this group of patients in this module.

# Postacute Episode of Care

Module 5 includes recommendations related to secondary prevention. Module 5b includes activities that are initiated during the postacute episode of care. Modules 6 through 9 represent the postacute episode of care. Module 10 provides recommendations related to the entire continuum of stroke care, but it centres largely on activities outside the hospital setting.

Recommendations in the following modules are not to be considered in isolation from the earlier modules; **the entire episode of care should be considered as a whole.**

Some recommendations may be similar to those in the acute episode of care (e.g., that pressure stockings not be used as part of the prevention strategies for venous thromboembolism). Similarities should be seen as an attempt to clarify intention in different environments; recommendations that are not repeated should still be considered valid in different settings.



**Figure 8: Postacute Episode-of-Care Model for Stroke**

Abbreviations: CA, contact assessment; CCC, complex continuing care; FIM, Functional Independence Measure; LTC, long-term care; MDS, minimum data set; RAI, Resident Assessment Instrument.

## Module 5: Secondary Prevention

This module identifies best practices for secondary prevention assessments and therapies. All activities should begin before discharge or shortly thereafter. Some activities are intended to begin in the acute episode of care (Module 5a), while others may begin immediately after discharge (Module 5b). This module is split into 2 sections to highlight these differences, but it should be seen as a continuum across the stroke episode of care.

### *Module 5b: Postacute Episode of Care*

Module 5b Recommended Practices	Contributing Sources of Evidence
<b>5.4 Lifestyle modification</b>	
5.4.1 Patients who have had a stroke should be assessed for vascular disease risk factors and lifestyle management issues. They should receive information and counselling about possible strategies to modify their lifestyle and risk factors in conjunction with appropriate medical treatment and/or pharmacotherapy	Based on CSBPR; modified by expert advisory panel consensus
5.4.2 Based on initial assessment, the interventions should be delivered by a health care professional with skills and training in behaviour modification	Based on expert advisory panel consensus in reference to the CAMH guide; (44) modified by expert advisory panel consensus
<b>Healthy balanced diet</b>	
5.4.3 Patients should eat a diet high in fresh fruits, vegetables, low-fat dairy products, dietary and soluble fibre, whole grains, and protein from plant sources. It should be low in saturated fat, trans fat, cholesterol and sodium, in accordance with <i>Canada's Food Guide to Healthy Eating</i> (55)	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with CSBPR, Australia and VA/DoD
<b>Sodium</b>	
5.4.4 Sodium intake should be restricted to 2000 mg/day (5 g of salt or 87 mmol of sodium). For detailed sodium recommendations, refer to the CHEP recommendations, endorsed by Hypertension Canada (45)	Based on expert advisory panel consensus in reference to the CHEP guidelines; consistent with CSBPR, Australia, and VA/DoD
<b>Exercise</b>	
5.4.5 Patients should participate in moderate exercise (an accumulation of 30 to 60 minutes), such as walking (ideally brisk walking), jogging, cycling, swimming or other dynamic exercise 4 to 7 days each week in addition to routine ADLs	Taken from CSBPR (level A evidence); consistent with Australia
5.4.6 High-risk patients (e.g., those with cardiac disease) should engage in medically supervised exercise programs. Refer also to the recommendations on aerobic exercise	Taken from CSBPR (level A evidence)
<b>Smoking</b>	
5.4.7 Patients who smoke should receive smoking-cessation counselling and referral to a smoking-cessation program. This may include providing information to patients with contact information and instructions for resources or other guidance	Based on the QBP Clinical Handbook for COPD and the QBP Clinical Handbook for Community-Acquired Pneumonia; modified by expert advisory panel consensus; consistent with CSBPR, Australia, and VA/DoD
<b>Alcohol consumption</b>	
5.4.8 Men: Limiting alcohol consumption to 0–3 standard drinks <sup>a</sup> per day and no more than 15 standard drinks <sup>a</sup> per week	Based on expert advisory panel consensus in reference to the Canadian low-risk drinking guidelines (48)
5.4.9 Women: Limiting alcohol consumption to 0–2 standard drinks <sup>a</sup> per day and no more than 10 standard drinks <sup>a</sup> per week	Based on expert advisory panel consensus in reference to the Canadian low-risk drinking guidelines (48)
<b>Weight</b>	
5.4.10 Patients should maintain a BMI of 18.5 to 24.9 kg/m <sup>2</sup> . Alternatively, they should maintain a waist circumference of:	Based on expert advisory panel consensus in reference to the IDF guidelines
<ul style="list-style-type: none"> <li>• Europids: &lt; 80 cm for females and &lt; 94 cm for males</li> <li>• South Asians: &lt; 80 cm for females and &lt; 90 cm for males</li> </ul>	

Module 5b Recommended Practices	Contributing Sources of Evidence
<ul style="list-style-type: none"> <li>Chinese: &lt; 80 cm for females and &lt; 90 cm for males</li> <li>Japanese: &lt; 80 cm for females and &lt; 90 cm for males</li> <li>Ethnic South and Central Americans: use the South Asian recommendations until more specific data are available</li> <li>Sub-Saharan Africans: use the Europid recommendations until more specific data are available</li> <li>Eastern Mediterranean and Middle East (Arab) populations: use the Europid recommendations until more specific data are available</li> </ul>	
5.4.11 All strategies to manage, prevent, and treat lifestyle-related health problems should be prescribed in conjunction with appropriate medical treatment and prevention and/or pharmacotherapy	Based on expert advisory panel consensus
<b>5.5 Blood pressure assessment and management</b>	
5.5.1 Patients should have their blood pressure monitored at every clinical encounter	Based on expert advisory panel consensus
5.5.2 Proper standardized techniques should be followed for blood pressure monitoring, including office, home, and community testing	Based on expert advisory panel consensus
5.5.3 All patients, whether normotensive or hypertensive, should receive blood pressure–lowering therapy, unless contraindicated by symptomatic hypotension, with first-line medications in the ACE inhibitor class with or without a diuretic added. Alternative medication classes include ARBs or calcium channel blockers. Unless the patient has a cardiovascular disease that requires their use, beta-blockers do not have benefits for stroke prevention in stroke patients	Based on Australia (level A evidence); modified by the expert advisory panel; consistent with CSBPR and VA/DoD
5.5.4 Blood pressure–lowering treatment is recommended for all patients to achieve a target consistently lower than 140/90 mm Hg, and in patients with diabetes, to less than 130/80 mm Hg	Based on expert advisory panel consensus in reference to the CHEP guidelines
5.5.5 Ambulatory blood pressure monitoring should be considered when an increase in blood pressure is suspected in treated patients with:	
<ul style="list-style-type: none"> <li>blood pressure that is not below target despite receiving appropriate chronic antihypertensive therapy</li> </ul>	Based on expert advisory panel consensus in reference to the CHEP guidelines
<ul style="list-style-type: none"> <li>symptoms suggestive of hypotension</li> </ul>	Based on expert advisory panel consensus in reference to the CHEP guidelines
<ul style="list-style-type: none"> <li>fluctuating office blood pressure readings</li> </ul>	Based on expert advisory panel consensus in reference to the CHEP guidelines
<b>5.6 Cholesterol and lipid management</b>	
5.6.1 Fasting lipid levels should be measured on all patients presenting with stroke or TIA	Based on CSBPR; modified by expert advisory panel consensus
<b>5.7 Diabetes screening</b>	
5.7.1 The Canadian Diabetes Association recommends that screening for diabetes should be performed every 3 years in individuals 40 years of age or older or at high risk. Poststroke patients are higher-risk, and more frequent and/or earlier testing should be considered in those at very high risk or in people with additional risk factors for diabetes	Based on expert advisory panel consensus in reference to the Canadian Diabetes Association guidelines
<b>5.8 Diabetes management</b>	
5.8.1 Patients who are comorbid with diabetes, they should maintain:	Based on the Canadian Diabetes Association guidelines; modified by expert advisory panel consensus
<ul style="list-style-type: none"> <li>blood glucose target of an HbA1c &lt; 7.0%</li> <li>blood pressure target of 130/80 mm Hg</li> <li>LDL target of &lt; 2.0 mmol/L</li> </ul>	
<b>5.9 Sleep apnea</b>	
5.9.1 Patients should be screened for the presence of sleep apnea symptoms using a validated sleep apnea screening tool	Based on CSBPR; modified by expert advisory panel consensus
5.9.2 Referral to a sleep laboratory with expertise in stroke is recommended for patients in whom sleep apnea is suspected. Criteria	Based on CSBPR; modified by expert advisory panel consensus

Module 5b Recommended Practices	Contributing Sources of Evidence
for referral may include patients with risk factors for sleep disordered breathing or suspicion based on clinical assessment	
5.9.3 Efforts should be made in the professional education of sleep lab staff so they can develop stroke expertise or efforts should be made in making sleep labs accessible	Based on the QBP Clinical Handbook for CHF; modified by the expert advisory panel
5.9.4 Patients and family members should be given ongoing education, counselling and support about the signs, symptoms, and risks of sleep apnea, as well as compliance with treatment to reduce stroke recurrence and increase recovery	Based on expert advisory panel consensus
<b>5.10 Long-term management and rehabilitation</b>	
5.10.1 All patients should be assessed by a stroke expert (e.g., a neurologist, general internist, physiatrist, or other physician with stroke expertise) to ensure stroke-prevention strategies are continued from the acute care setting or initiated as appropriate. Transfer of information to the primary care provider is essential for them to continue long-term management	Based on expert advisory panel consensus
5.10.2 If available, initial postacute stroke/TIA care should be through a specialized stroke-prevention clinic with an interprofessional team that has expertise in stroke (see also OHTAC recommendation on TIA/minor stroke, recommendation 2.4.1)	Based on expert advisory panel consensus in consideration of HQO's EBA Is Transient Ischemic Attack a Medical Emergency? (18) and accompanying OHTAC recommendation
5.10.3 Patients should be followed regularly by a primary care provider to address ongoing issues with stroke risk factors, continue treatment of comorbidities, and referral to community-based resources as necessary	Based on VA/DoD; modified by expert advisory panel consensus
<ul style="list-style-type: none"> <li>The primary care provider should follow a Post Stroke Checklist (PSC) (44), endorsed by the World Stroke Organization and Canadian Stroke Network, to make appropriate home care referrals</li> </ul>	Based on CSBPR; modified by expert advisory panel consensus
5.10.4 Patients with residual impairment identified as having further rehabilitation needs should receive therapy services to set new goals and improve task-oriented activity	Based on expert advisory panel consensus
<b>5.11 Management of cholesterol</b>	
5.11.1 Statin agents should be prescribed for most patients who have had a TIA or ischemic stroke, to achieve recommended lipid levels	Based on CSBPR (level A evidence); modified by expert advisory panel consensus
5.11.2 Patients with TIA or ischemic stroke should achieve an LDL cholesterol of < 2.0 mmol/L or a reduction in LDL by 50% of their baseline level	Based on CSBPR (level A evidence); modified by expert advisory panel consensus
Abbreviations: ACE, angiotensin-converting enzyme; ADL, activity of daily living; ARB, angiotensin receptor blocker; Australia, Australian Clinical Guidelines for Stroke Management; BMI, body mass index; CAMH, Centre for Addiction and Mental Health; CSBPR, Canadian Stroke Best Practice Recommendations; CHEP, Canadian Hypertension Education Program; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; DoD, Department of Defence; EBA, evidence-based analysis; HbA1c, hemoglobin A1c; HQO, Health Quality Ontario; ICH, intracerebral hemorrhage; IDF, International Diabetes Federation; LDL, low-density lipoprotein; OHTAC, Ontario Health Technology Advisory Committee; QBP, Quality-Based Procedures; TIA, transient ischemic attack; VA, Veterans Affairs. <sup>a</sup> A "standard drink" is equal to a 341 mL (12 oz) bottle of 5% strength beer, cider or cooler; a 142 mL (5 oz) glass of 12% strength wine; or a 43 mL (1.5 oz) shot of 40% strength spirits (note: 1 Canadian standard drink = 17.05 mL or 13.45 g of ethanol)	

The following implementation considerations were noted by members of the expert advisory panel.

Module 5 Implementation Considerations
<b>General considerations</b> <i>Behaviour and lifestyle modification</i> <ul style="list-style-type: none"> <li>Where required, behaviour and lifestyle modification should be made available, at no cost, to all patients and caregivers. Lifestyle behaviours that should be monitored include: <ul style="list-style-type: none"> <li>eating/nutrition counselling and modification</li> <li>weight control</li> <li>exercise</li> </ul> </li> </ul>

- 
- smoking cessation
  - alcohol restriction
  - sodium intake
  - stress reduction
  - sleep modification therapy
  - Behaviour modification/lifestyle therapies should be delivered by a health care professional with skills and training in behaviour modification

#### *Screening tool*

- A validated screening tool for sleep apnea should be developed and implemented

#### *Blood pressure*

- Patients should have their blood pressure monitored at every health care encounter, supplemented by home-based blood pressure monitoring if indicated
- Consider access to no-cost ambulatory blood pressure monitoring

#### *Smoking cessation*

- Smoking-cessation strategies that specifically target stroke patients should be developed and implemented. Targeted smoking-cessation materials and messaging should be emphasized to all patients with a chronic disease; in this patient group, it is shown to have a significant, positive, immediate clinical outcome
- NRT should be made a free benefit to any Ontario resident with a health card
- Public health departments should hand out free NRT under the “STOP” program; pharmacies should be permitted to do the same after screening patients
- Smoking-cessation drug therapy should be made available at no cost to all Ontarians with prescription from a physician or from another health care professional under a medical directive and trained in smoking cessation

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Abbreviation: NRT, nicotine replacement therapy.

## Module 6: /Discharge Planning

This module identifies recommended practices for discharge planning to facilitate recovery and community reintegration in postacute stroke patients. The recommendations stress the importance of transitional care planning, ensuring patients and caregivers are given appropriate resources, and giving patients and caregivers the support and education they need after discharge. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

Module 6 Recommended Practices	Contributing Sources of Evidence
<b>6.1 Predischarge planning</b>	
6.1.1 Before hospital discharge, all patients should be assessed to determine the need for an at-home assessment, which is carried out to ensure safety and provision of appropriate aids, support and community services. Discharge home visits should be conducted before discharge. Patients who require a home assessment should be visited by an appropriate health care provider (e.g., an occupational therapist) before discharge or within 1 week postdischarge. Caregivers should also be assessed for support they may need in their caregiving role	Based on Australia (level C evidence); modified by the expert advisory panel
6.1.2 The interprofessional team should assess patients within 24–48 hours of admission to acute care and develop a comprehensive individualized rehabilitation plan for the postacute episode that reflects the severity of the stroke and the needs and goals of the stroke patient	Based on expert advisory panel consensus, in reference to acute episode-of-care modules (Modules 1–5a)
6.1.3 Clinicians should use standardized valid assessment tools to evaluate the patient's postacute stroke-related impairments	Based on and modified by expert advisory panel consensus, in reference to the acute episode-of-care modules (Modules 1–5a)
6.1.4 AlphaFIM should be used as a standard assessment tool for all patients before discharge	Based on expert advisory panel consensus, in reference to acute episode-of-care modules (Modules 1–5a)
<b>6.2 Preparing for transition</b>	
6.2.1 Transitional care plans should be developed using a standardized approach. The plan should: <ul style="list-style-type: none"> <li>involve patients and families/caregivers in plan development</li> <li>include essential education on health</li> <li>include conditions and medications</li> <li>include essential instructions to the patient (e.g., when to see primary care provider, when to go to the ED, what to do if conditions change, and how to identify conditions that can increase risk of readmission, such as urinary tract infection)</li> <li>be easy to read (i.e., use plain language and be available in multiple languages or be aphasia-friendly)</li> <li>include a referral as for a community assessment for rehabilitation needs appropriate</li> <li>give patients and caregivers a number to call/contact if they have any questions</li> </ul>	Based on expert advisory panel consensus in reference to the Health Links Guide to Adopting a Common Approach to Transitional Care Planning (39)
<b>6.3 Assistance to family, friends, and caregivers</b>	
6.3.1 Patients, families, and informal caregivers should be prepared with appropriate and realistic expectations about role changes and the availability of services and resources in changing care environments	Taken from CSBPR (level C evidence)
6.3.2 Caregivers should be given tailored information and support during all stages of the recovery process. This includes (but is not limited to) information provision and opportunities to talk with relevant health care professionals about the stroke; stroke team members and their roles; test or assessment results; intervention plans; discharge planning; community services; and appropriate contact details	Taken from Australia (level C evidence)

Module 6 Recommended Practices	Contributing Sources of Evidence
<b>6.4 Discharge planning</b>	
6.4.1 The interdisciplinary team should initiate discharge planning on admission in the inpatient setting. A process should be established to ensure that patients, families, and informal caregivers are involved in discharge planning. Their discharge plan may include stroke education, information about follow-up tests, appointments, and referrals to stroke-prevention clinics and primary care as appropriate	Based on <a href="#">Communication of Discharge Instructions: A Rapid Review</a> ; consistent with NICE, SIGN, VA/DoD, and CSBPR
6.4.2 A goal-oriented discharge plan should be formulated with the patient, family, and caregiver in collaboration with the interprofessional team for transition to the community, TIA clinic, rehabilitation, retirement home, and long-term care facility	Based on CSBPR (level B evidence); modified by the expert advisory panel; consistent with NICE, SIGN, and VA/DoD
6.4.3 Possible discharge issues and patient needs that could delay discharge should be identified and addressed early in the discharge-planning process	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with NICE, SIGN, and VA/DoD
6.4.4 Each health care organization should put standardized processes in place to ensure that before transition, a follow-up appointment(s) is scheduled with patients' primary care provider after transition	Based on expert advisory panel consensus in reference to the Health Links Guide to Adopting a Common Approach to Transitional Care Planning (38)
6.4.5 The primary care provider should follow a Post Stroke Checklist (50), endorsed by the World Stroke Organization and the Canadian Stroke Network, in order to make appropriate home care referrals	Based on CSBPR; modified by the expert advisory panel
6.4.6 Patients should receive a follow-up phone call from a designated health care professional within 48 hours of discharge from hospital to home. The purpose of the call is to monitor patient progress; establish community networks for meeting patient needs; enhance patient education and self-management training; provide follow-up/reinforcement of the transition plan; and ensure required home care services are in place	Based on expert advisory panel consensus in reference to the Health Links Guide to Adopting a Common Approach to Transitional Care Planning (38)
<b>6.5 Discharge patient from inpatient setting</b>	
6.5.1 Family and caregivers should receive all necessary equipment and training before discharge from their inpatient rehabilitation setting	Based on VA/DoD (level I evidence); modified by the expert advisory panel
Abbreviations: Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; ED, emergency department; FIM, Functional Independence Measure; HQO, Health Quality Ontario; NICE, National Institute for Health and Care Excellence; SIGN, Scottish Intercollegiate Guideline Network; TIA, transient ischemic attack; VA, Veterans Affairs.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 6 Implementation Considerations
<b>General considerations</b>
<i>Length of stay</i>
<ul style="list-style-type: none"> <li>Most providers are not meeting the target for inpatient rehabilitation LOS due to: <ul style="list-style-type: none"> <li>lack of access to postacute treatment and rehabilitation (particularly for severe stroke patients)</li> <li>insufficient resources in hospital and community</li> <li>lack of resources to provide the required intensity of rehabilitation, including a minimum of physiotherapy, occupational therapy, and speech-language pathology, both in hospital and after discharge</li> </ul> </li> </ul>
<i>Discharge planning</i>
<ul style="list-style-type: none"> <li>The LHIN metric that measures referral to CCAC service provision should be revised; in some cases, the period between referral to CCAC and discharge from hospital for stroke patients may be 7 weeks</li> <li>The LHIN metric that measures referral to outpatient services should be revised to consider time to service delivery</li> <li>The HQO/Ministry of Health and Long-Term Care discharge-planning standards should be implemented and followed in all hospitals</li> </ul>

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*Patient education*

- Patient feedback has shown that multiple education materials are confusing. Consistent patient education materials should be developed and used by all providers. (The Canadian Stroke Group is attempting to address this issue)
- Materials for patients should be user-friendly and available in multiple languages. Aphasia-friendly material should also be made available. Alternate materials should be available for patients who are not literate

*Patient assessment*

- The AlphaFIM instrument should be used as the standard assessment tool and completed on or by day 3 after admission (target day 3, admission day is day 1) to hospital. This can be a challenge when weekend coverage for allied health providers is limited; hospitals providing stroke services should work to have sufficient human resources to ensure allied health coverage 7 days per week
- In all cases, the AlphaFIM Instrument rating should be reported in the DAD

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Abbreviations: CCAC, Community Care Access Centre; DAD, Discharge Abstract Database; FIM, Functional Independence Measure; HQO, Health Quality Ontario; LHIN, Local Health Integration Network; LOS, length of stay.

## Module 7: Early Supported Discharge

Early supported discharge (ESD) is “a form of rehabilitation designed to accelerate the transition from hospital to home through the provision of rehabilitation therapies delivered by an interprofessional team in the community.” (48) It is intended as an alternative to a complete course of inpatient rehabilitation and is most suitable for patients recovering from mild to moderate stroke. (60) ESD should include services provided by a well-resourced, specialized, interprofessional team whose work is coordinated with regular team meetings. (29) Services should be provided 5 days per week at the same level of intensity as in the inpatient setting, and may act as a transition point to ambulatory or community stroke rehabilitation as appropriate. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

Module 7 Recommended Practices	Contributing Sources of Evidence
<b>7.1 Eligibility criteria</b>	
7.1.1 Criteria for ESD candidacy should include:	
<ul style="list-style-type: none"> <li>• mild to moderate disability</li> </ul>	Based on CSBPR (level B evidence); modified by the expert advisory panel
<ul style="list-style-type: none"> <li>• ability to participate in rehabilitation from the point of discharge</li> </ul>	Based on CSBPR (level A evidence); modified by the expert advisory panel
<ul style="list-style-type: none"> <li>• medical stability and availability of necessary resources and support services for safe management at home</li> </ul>	Based on Fisher et al, 2011 (47)
<ul style="list-style-type: none"> <li>• access to community services and support</li> </ul>	Based on expert advisory panel consensus
<b>7.2 ESD interprofessional team</b>	
7.2.1 ESD services should be provided by a well-resourced, coordinated, specialized interprofessional team	Based on CSBPR (level A evidence); modified by the expert advisory panel
7.2.2 An ESD team should include a physiotherapist, an occupational therapist, a nurse, a speech-language pathologist, a physician, a social worker, and an administrative assistant	Based on CSBPR
7.2.3 Patients should be linked with primary care	Based on expert advisory panel consensus
<b>7.3 ESD delivery</b>	
7.3.1 ESD services must be given in 48 hours of discharge from an acute hospital or within 72 hours of discharge from rehabilitation	Based on and modified by expert advisory panel consensus
7.3.2 ESD services should be provided 5 days per week at the same level of intensity as they would have received in the inpatient setting to meet patient needs	Based on and modified by expert advisory panel consensus
7.3.3 A hospital-based ESD team should plan and coordinate both discharge from hospital and provide rehabilitation and support in the community	Taken from CSBPR (levels A–C evidence)
7.3.4 Key components contributing to favourable outcomes should include:	Based on CSBPR; modified by the expert advisory panel
<ul style="list-style-type: none"> <li>• discharge planning beginning in the hospital</li> <li>• a care coordinator or key worker based in the stroke unit who constitutes the link between the stroke unit and outpatient care</li> <li>• a formal process in place to ensure timely and efficient transfer</li> </ul>	
7.3.5 The length of intervention offered by ESD should be based on patient needs and the existence and type of other community-based stroke services operating in the area	Expert advisory panel consensus

Abbreviations: CSBPR, Canadian Stroke Best Practice Recommendations; ESD, early supported discharge.

The following implementation considerations were noted by members of the expert advisory panel.

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### Module 7 Implementation Considerations

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#### General considerations

##### *Early supported discharge*

- Make ESD available to all stroke patients in Ontario; ESD does not currently exist in Ontario, and LHINs need to find capacity for this service
- Barriers that restrict patient flow from hospital to community rehabilitation should be removed
- Hospitals should manage the waiting list for patients waiting in the community for hospital-based rehabilitation program(s)
- Provide incentives for a "warm hand-off" from hospital to community-based services
- Provide additional rehabilitation services to:
  - ensure access to intensive interprofessional community stroke rehabilitation programs to meet the ongoing rehabilitation needs of patients transitioning from ESD
  - make ESD programs accessible
  - provide equity of access to stroke rehabilitation across the province
- Consideration should be given to finding opportunities for alignment and integration between ESD and community treatment to ensure and support seamless patient care

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Abbreviations: ESD, early supported discharge; LHIN, Local Health Integration Network.

## Module 8: Community Assessment

This module identifies recommended practices for assessing a patient pre- and postdischarge. The aim of assessment is to identify impairments in physical, cognitive, psychosocial, and communication functioning, as well as functional activities, important life roles, and participation, to determine discharge needs and the rehabilitation services required. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

Module 8 Recommended Practices	Contributing Sources of Evidence
<b>8.1 Driving</b>	
<p>8.1.1 After 1 month, patients should be instructed not to resume driving until a comprehensive assessment is conducted by an appropriate health care provider. This assessment should include screening for any residual sensory, motor, or cognitive deficits:</p> <ul style="list-style-type: none"> <li>• sensory assessment focuses on vision, visual fields, visual attention, and reading comprehension</li> <li>• motor assessment focuses on strength, coordination, and reaction time</li> <li>• cognitive assessment focuses on perception, problem-solving, speed of decision-making, and judgment</li> </ul> <p>8.1.2 Patients for whom there is a concern about their ability to drive should be referred to training programs, such as simulator-based training, to help prepare for a road test or the resumption of driving</p> <p>8.1.3 A government-sanctioned road test is recommended for some patients with residual deficits before a return to driving. Guidance for patients about the need for a formal driving test should come from either the rehabilitation team or other appropriate health care provider who has assessed the patient for return to driving (e.g., neurologist, eye specialist, or family practitioner)</p>	<p>Based on CSBPR (level B evidence), which references the CCMTA Medical Standards for Drivers; (39) modified by the expert advisory panel</p> <p>Taken from CSBPR</p> <p>Based on CSBPR (level C evidence), which references the CCMTA Medical Standards for Drivers; (39) modified by the expert advisory panel</p>
<b>8.2 Dysphagia</b>	
8.2.1 Patients with new or worsening dysphagia should be referred to a speech-language pathologist and if necessary, a registered dietitian for assessment, recommendations, and a nutrition plan	Based on expert advisory panel consensus in reference to the CCAC OBP (49)
<b>8.3 Aphasia</b>	
8.3.1 Patients with known or suspected communication difficulties after stroke should be referred to a speech-language pathologist for assessment and be offered treatment	Based on NICE; modified by the expert advisory panel; consistent with CSBPR
8.3.2 The impact of aphasia on functional activities, quality of life, including the impact upon relationships), vocation, and leisure should be assessed by a speech-language pathologist and addressed from early after onset and over time for those chronically affected	Based on Australia (level GPP evidence); modified by the expert advisory panel
<b>8.4 Nutrition and hydration</b>	
8.4.1 All patients should be screened for malnutrition and dehydration by a nurse or registered dietitian	Based on Australia (level B evidence); modified by the expert advisory panel; consistent with CSBPR and VA/DoD
8.4.2 If a nutrition plan or assessment was already conducted, a review of the initial assessment should be done in the context of the patients' functional environment by a nurse or registered dietitian	Based on expert advisory panel consensus
<b>8.5 Visual and auditory feedback</b>	
8.5.1 All patients should be screened for visual perceptual deficits as a routine part of the broader rehabilitation assessment process	Based on CSBPR (level C evidence); modified by the expert advisory panel
8.5.2 Patients with suspected perceptual impairments (visual neglect, nonlateralized visuospatial impairment, agnosias, prosopagnosia, body schema disorders, and apraxias) should be assessed using validated tools. Tools should be adapted for use with patients who have communication limitations, such as aphasia	Based on CSBPR (level C evidence); modified by the expert advisory panel

Module 8 Recommended Practices	Contributing Sources of Evidence
8.5.3 Patients who have difficulty with vision (i.e., recognizing objects or people, dizziness, visual field loss, balance impairments, difficulty reading, midline shift, increased light sensitivity, inability to cope with busy environments, etc.) or difficulty hearing should be screened using specific assessment tools for visual and auditory deficits. If a deficit is found, the patient should be referred to relevant health care professionals (e.g., audiologist, optometrist, neurologist, etc.)	Based on Australia (level GPP evidence); modified by the expert advisory panel
<b>8.6 Prevention of skin breakdown</b>	
8.6.1 Evidence-based RNAO guidelines Risk Assessment and Prevention of Pressure Ulcers (50) should be used to plan prevention strategies that will minimize the risk of pressure ulcer development	Based on expert advisory panel consensus
8.6.2 Risk for skin breakdown should be assessed using a standardized assessment tool (such as the Braden Scale)	Taken from VA/DoD (level 1 evidence)
8.6.3 If skin breakdown is suspected, patients should be referred to either a wound care specialist or a nurse to implement prevention strategies. <i>Refer to recommendation 9.9 for details on wound care</i>	Based on expert advisory panel consensus
<b>8.7 Depression</b>	
8.7.1 All patients should be screened for depression with a validated tool	Based on CSBPR (level A evidence); modified by the expert advisory panel
8.7.2 Screening should also include evaluation of risk factors for depression—particularly a history of depression—and it should take place throughout the continuum of stroke care	Based on CSBPR (level C evidence); modified by the expert advisory panel
8.7.3 Screening should take place before hospital discharge to the community, during early rehabilitation, before discharge to the community, and whenever clinical presentations occur	Based on CSBPR (level B evidence); modified by the expert advisory panel
8.7.4 Patients identified as being at risk of depression during screening should be referred to a health care professional with expertise in diagnosis and management of depression	Based on CSBPR (level A evidence); modified by the expert advisory panel
<b>8.8 Vascular cognitive impairment and dementia</b>	
8.8.1 All patients with vascular risk factors should be considered at high risk for vascular cognitive impairment and should be screened using the Montreal Cognitive Assessment. The Montreal Cognitive Assessment is considered more sensitive to cognitive impairment than the Mini-Mental Status Exam in patients with vascular cognitive impairment	Based on and modified by expert advisory panel consensus, in reference to acute episode-of-care modules (Modules 1–5a)
<b>8.9 Apraxia</b>	
8.9.1 People with suspected difficulties executing tasks but who have adequate limb movement should be screened for apraxia and, if indicated, complete a comprehensive assessment	Based on Australia (level GPP evidence)
<b>8.10 Continence</b>	
8.10.1 All patients with suspected urinary continence difficulties should be assessed by trained personnel using a structured functional assessment to determine cause and develop an individualized management plan	Based on CSBPR; modified by the expert advisory panel
<b>8.11 Mobility/falls prevention and management</b>	
8.11.1 All patients should be screened at admission for risk of falls by an experienced clinician. This screening should include comprehensive interprofessional assessment of medical functional history and examination of balance, mobility, vision, perception, cognition, cardiovascular status, ADLs, IADL, seating, motor function, and somatosensory deficits. Based on assessment, an individualized falls-prevention strategy should be implemented	Taken from CSBPR (level C evidence); modified by the expert advisory panel
Abbreviations: ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; CCAC, Community Care Access Centre; CCMTA, Canadian Council of Motor Transport Administrators; DoD, Department of Defence; IADL, instrumental activity of daily living; NICE, National Institute for Health and Care Excellence; OBP, outcome-based pathway; RNAO, Registered Nurses' Association of Ontario; VA, Veterans Affairs.	

The following implementation considerations were noted by members of the expert advisory panel.

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### Module 8 Implementation Considerations

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#### General considerations

##### *Assessments*

- All inpatient assessments should be made available to and reviewed by community-based service providers where possible, before discharge and in advance to support dialogue before the patient is home

##### *Primary care and specialists*

- Ensure timely access to specialists and resources in the community. Where there is a lack of resources to meet demand, the LHIN should begin a capacity-planning exercise to fill the gap
- Primary care providers should coordinate with community-based service providers to develop an integrated care plan. The HQO/HealthLinks initiative should be implemented in all primary care practices to better coordinate patient care
- To use scarce resources more efficiently, primary care providers should refer patients to relevant community-based stroke services, based on patients' individual needs (e.g., outpatient rehabilitation programs, home care services, stroke-prevention clinics, etc.). Primary care providers should be updated regularly so that care plans and care coordination can be adjusted accordingly
- No single solution to community services exists. That is, while facility/practitioner-based services would be most effective and efficient, there are patients who cannot access centralized care due to distance or lack of transport etc. A variety of programs will be required, and the programs will have to be adequately resourced

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Abbreviations: HQO, Health Quality Ontario; LHIN, Local Health Integration Network.

## Module 9: Community Treatment

This module identifies the multifaceted components of community-based rehabilitation, emphasizing task-oriented training, excellent team coordination with specialization in stroke care, and treatment as early as possible. Community treatment should be based on the patients' individual assessment as described in Module 8, and therapies should be focused on areas where retraining and development are needed. Overarching rehabilitation goals are to improve functional abilities, which in turn enhance reintegration into the community; mobility; activities of daily living; balance; recovery of arm/leg function and trunk control; cognition; perception; pain management; mental health; language and communication function; and swallowing. All patients should be given appropriate cross-continuum prevention assessment and therapies (Modules 5 and 10).

Module 9 contains 7 tables, each related to a unique aspect of the rehabilitation program:

- 9a: General rehabilitation and core interprofessional team
- 9b: Mood and cognition
- 9c: Swallowing, nutrition/hydration, and communication
- 9d: Physical activity, fitness, and activities of daily living
- 9e: Upper extremity management
- 9f: Shoulder and central pain management
- 9g: Lower extremity mobility

### *9a: Recommendations for General Rehabilitation and the Core Interprofessional Team*

Module 9a Recommended Practices	Contributing Sources of Evidence
<b>9.1 Residual impairment</b>	
9.1.1 Individuals with residual impairment after stroke and needing rehabilitation should receive therapy services to set goals and improve task-oriented activity	Based on CSBPR (level B evidence); modified by the expert advisory panel
<b>9.2 Early intervention</b>	
9.2.1 Rehabilitation should begin as early as possible once medical stability is reached	Based on and modified by expert advisory panel consensus, in reference to acute episode-of-care modules (Modules 1–5a)
9.2.2 Outpatient and/or community-based rehabilitation services should be available within 48 hours of discharge from an acute hospital or within 72 hours of discharge from inpatient rehabilitation	Taken from CSBPR (level C evidence)
<b>9.3 Rehabilitation location</b>	
9.3.1 Procedures should enable inpatient admission 7 days per week	Based on and modified by expert advisory panel consensus, in reference to acute episode-of-care modules (Modules 1–5a)
9.3.2 In the community, patients should have access to specialist-based rehabilitation services	Consistent with the QBP Clinical Handbook for Homecare; consistent with CSBPR (level A evidence)
9.3.3 Rehabilitation should be structured to provide as much therapy as possible within the first 6 months after stroke	Consistent with the QBP Clinical Handbook for Homecare; consistent with Australia (level A evidence)
9.3.4 Community-based clinic services (including hospitals) are preferred. Where centre-based rehabilitation is inaccessible or does not address a patient's individual needs, home-based rehabilitation should be provided by a coordinated and organized interprofessional team	Consistent with the QBP Clinical Handbook for Postacute Medical Discharge Short-Stay Populations
<b>9.4 Core interprofessional team</b>	

Module 9a Recommended Practices	Contributing Sources of Evidence
9.4.1 An interprofessional rehabilitation team should be available based on individual needs and should include an occupational therapist, a primary care provider, a nurse, a physiotherapist, a speech-language pathologist, a psychologist, a social worker, a registered dietitian, a pharmacist, a therapeutic recreational specialist, therapy/rehabilitation assistant(s), the patient, and the family and/or caregivers	Based on and modified by expert advisory panel consensus, in reference to acute episode-of-care modules (Modules 1–5a); consistent with CSBPR and VA/DoD
9.4.2 The interprofessional stroke team should meet regularly to discuss assessment of new patients, review patient management and goals, and plan for discharge	Based on Australia; modified by the expert advisory panel; consistent with the evidence from the Southwest LHIN Community Rehabilitation Team
9.4.3 The members of the interprofessional stroke team should be specialized in stroke care	Based on expert advisory panel consensus
9.4.4 Patients should receive a coordinated care plan (from a care coordinator) that forms an informational continuum between community care service providers, primary care, and (where appropriate) the hospital. The care plan and care coordination should align with HealthLinks and primary care	Based on <a href="#">Care Coordination for Postacute Stroke, Chronic Obstructive Pulmonary Disease, and Heart Failure Clients: A Rapid Review</a> and <a href="#">Care Coordination for Postacute Stroke, Chronic Obstructive Pulmonary Disease, and Heart Failure Clients: An Economic Rapid Review</a> ; consistent with the QBP Clinical Handbook for Homecare
9.4.5 A care coordinator must ensure that the right services are provided to the right patients at the right time by leading and coordinating a patient's discharge plan and assessment via a centralized care plan and: <ul style="list-style-type: none"> <li>• assessing and reassessing client needs for home care services based on the interRAI assessment tool</li> <li>• determining eligibility for services based on needs and developing plans of service for eligible patients in collaboration with caregivers</li> <li>• coordinating community-based services and linking to primary care to help patients meet the goals of optimal health and independence</li> <li>• adjusting home/community services when patient requirements change and discharging patients as soon as services are no longer required</li> <li>• counselling patients, families, and caregivers</li> <li>• helping patients and families develop the knowledge, skills, and ability to make choices to enhance their living</li> </ul>	Based on expert advisory panel consensus in reference to the CCAC Policy Manual; modified by the expert advisory panel
9.4.6 A comprehensive shared care plan should be in place and all members of the interprofessional team should have access to the patients' RAI assessment, as well as any other documents that can facilitate service providers in understanding the patient's condition at discharge	Based on expert advisory panel consensus
9.4.7 Ongoing communication between the team should be promoted and maintained by the care coordinator	Based on <a href="#">Care Coordination for Postacute Stroke, Chronic Obstructive Pulmonary Disease, and Heart Failure Clients: A Rapid Review</a> and <a href="#">Care Coordination for Postacute Stroke, Chronic Obstructive Pulmonary Disease, and Heart Failure Clients: An Economic Rapid Review</a> ; consistent with the QBP Clinical Handbook for Homecare
<b>9.5 Occupational therapist</b>	
9.5.1 Moderate quality evidence suggests that occupational therapists in the home should be provided as currently offered in Ontario (2–3 visits per week, for 8–12 weeks) to all postdischarge stroke patients of mild-moderate severity with an aim to improving ADLs and IADLs	Consistent with the QBP Clinical Handbook for Homecare and OSN Stroke Reference Group Recommendation
9.5.2 By extension, all postdischarge stroke patients of increased severity (severe) should also benefit and are also recommended for occupational therapy in the home as currently offered in Ontario to improve ADLs and IADLs. The evidence is based on a higher maximum level of occupational therapy visits in the home; therefore,	Consistent with the QBP Clinical Handbook for Homecare

Module 9a Recommended Practices	Contributing Sources of Evidence
occupational therapy services and patient outcomes should be tracked and services be increased, if needed, to achieve the desired patient outcomes	
9.5.3 In addition to exercise, the following interventions should be made available to/promoted for use by the community-dwelling elderly: <ul style="list-style-type: none"> <li>environmental modifications in high-risk populations</li> <li>use of gait-stabilizing devices outdoors in the mobile elderly</li> </ul>	Consistent with the QBP Clinical Handbook for Homecare
<b>9.6 Physiotherapist</b>	
9.6.1 The delivery of physiotherapy at home should be based on expert opinion, in conjunction with a patient's initial assessment	Consistent with the QBP Clinical Handbook for Homecare
9.6.2 Patients should be given 2–3 visits per week for 8–12 weeks (combined with centre-based care whenever appropriate). See Module 9d for more detail	Consistent with the OSN Stroke Reference Group recommendation
9.6.3 Multifactorial interventions in the community, including an individually prescribed exercise program, should be provided for any person poststroke with residual impairment, including those who are at risk of falling	Consistent with the QBP Clinical Handbook for Homecare
<b>9.7 Speech-language pathologist</b>	
9.7.1 Communication, speech, and swallowing assessments should occur pre-discharge, and patients should be referred to a speech-language pathologist for a postdischarge detailed assessment. They should be offered treatment (if there is potential for functional improvement) if persisting communication and/or swallowing difficulties are identified	Consistent with the QBP Clinical Handbook for Homecare
9.7.2 Patients should be given 2–3 visits/week for 8–12 weeks (combined with centre-based care whenever appropriate). See Module 9d for more detail	Consistent with the OSN Stroke Reference Group recommendation
<b>9.8 Self-management/patient education</b>	
9.8.1 Patients who are cognitively able should have a self-management and educational plan before discharge from hospital and receive support for this plan through the duration of their care in the community	Based on <a href="#">Self-Management and Educational Interventions in the Postacute Stroke Population: A Rapid Review</a> ; consistent with the QBP Clinical Handbook for Homecare
9.8.2 Self-management and education should be offered as early as possible, ideally within 2–3 weeks postdischarge	Based on <a href="#">Self-Management and Educational Interventions in the Postacute Stroke Population: A Rapid Review</a> ; consistent with the QBP Clinical Handbook for Homecare
9.8.3 Assessment of health literacy, numeracy and cognition should be completed to adapt the education plans as necessary (including materials in different languages)	Consistent with the QBP Clinical Handbook for Homecare
9.8.4 Education should start pre-discharge and be continued and enhanced in the community. Education should be provided frequently, consistently, and using a variety of mediums	Consistent with the QBP Clinical Handbook for Homecare
9.8.5 Education should be provided to patients, informal caregivers, and primary care providers on medication management, smoking cessation, alcohol use, weight monitoring, symptom monitoring, nutritional assessment (e.g., sodium restriction, fluid intake), physical activity and exercise, coping with comorbidities, and advanced care planning	Consistent with the QBP Clinical Handbook for Homecare
9.8.6 By the end of education, patient and/or caregivers should be able to state, at a minimum, the plan for worsening signs and symptoms (or exacerbation)	Consistent with the QBP Clinical Handbook for Homecare
9.8.7 Family counselling focused on psychosocial and emotional issues and role adjustment should be encouraged and made available to patients and their family members upon discharge	Taken from VA/DoD
<b>9.9 Wound care</b>	

Module 9a Recommended Practices	Contributing Sources of Evidence
9.9.1 Evidence-based RNAO wound care guidelines (58) should inform best practices across the province in wound care management	Consistent with the QBP Clinical Handbook for Homecare. Based on the HQO rapid review on wound care
9.9.2 Patients returning home and their caregivers should be trained in proper positioning, turning, and transferring techniques and the use of barrier sprays, lubricants, special mattresses (seating), and protective dressings and padding to avoid skin injury due to maceration, friction, or excessive pressure	Consistent with the QBP Clinical Handbook for Homecare
9.9.3 If the wound is not healing due to multiple factors, home care nurses should consult a wound care expert or refer the patient to a specialized wound care clinic in their area	Consistent with the QBP Clinical Handbook for Homecare
9.9.4 If there is a concern about wound healing, patients should be referred to appropriate health care professionals (e.g., a registered dietitian for nutritional support) to assess other factors that may affect healing of wounds	Consistent with the QBP Clinical Handbook for Homecare
9.9.5 A system-wide QBP should be undertaken due to the amount of wound care delivered by the home care sector and the cost associated	Consistent with the QBP Clinical Handbook for Homecare
<b>9.10 Personal support services</b>	
9.10.1 InterRAI should be used to assess the patient's need for personal support. The personal support worker services provided and their intensity should be based on specific patient needs and the availability of caregivers and other community-based resources, as assessed by a home care coordinator, and consistent scope of practice should be ensured. Personal support worker services can include personal care, home management and other routine ADLs in accordance with the <i>Regulated Health Professions Act</i> . Access to personal support worker services vary in Ontario, and considerations should be made to standardize this access	Consistent with the QBP Clinical Handbook for Homecare
<b>9.11 Continence</b>	
9.11.1 Stroke survivors with confirmed continence difficulties should have a continence management plan formulated, documented, implemented, and monitored	Based on Australia (level C evidence); modified by the expert advisory panel; consistent with VA/DoD, SIGN, and CSBPR
9.11.2 A bladder-training program should be implemented in patients with urinary incontinence	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with Australia, VA/DoD, and SIGN
9.11.3 A bowel-management program should be implemented for those with persistent constipation or bowel incontinence	Based on CSBPR (level A evidence); modified by the expert advisory panel; consistent with Australia, VA/DoD, and SIGN
9.11.4 Patients discharged from hospital and requiring an indwelling urinary catheter for medical reasons should have follow-up arranged with a urologist to re-evaluate the need for the catheter over time. If catheters are used, they should be assessed daily and removed as soon as possible	Based on CSBPR (level A evidence); modified by the expert advisory panel; consistent with Australia, VA/DoD, and SIGN
9.11.5 Excellent pericare and infection-control strategies should be implemented	Taken from CSBPR (level C evidence)
<b>9.12 Prevention of skin breakdown</b>	
9.12.1 Patients returning home and their caregivers should be trained in proper positioning, turning, transferring techniques, and the use of barrier sprays, lubricants, special mattresses (seating), and protective dressings and padding to avoid skin injury due to maceration, friction, or excessive pressure	Based on VA/DoD (level C evidence); modified by the expert advisory panel
<b>9.13 Leisure</b>	
9.13.1 Leisure activities should be identified, and the patient should	Based on VA/DoD (level I evidence); modified by

Module 9a Recommended Practices	Contributing Sources of Evidence
be enabled to participate in these activities	the expert advisory panel
9.13.2 Patients who experience difficulty engaging in leisure activities should receive targeted therapeutic interventions	Taken from CSBPR (level A evidence)
9.13.3 Therapy for individuals with stroke should include the development of problem-solving skills to overcome the barriers to engagement in physical activity and leisure pursuits. The caregiver should be included where appropriate	Based on VA/DoD; modified by the expert advisory panel
9.13.4 Patients should receive information regarding leisure activities in the community and/or be referred to relevant agencies. Use of peer support groups should be encouraged where available. The caregiver should be included where appropriate	Based on CSBPR (level C evidence); modified by the expert advisory panel
<b>9.14 Return to work</b>	
9.14.1 All patients who were previously employed should be assessed for and provided access to vocational counselling for assistance in returning to work	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
9.14.2 A detailed cognitive assessment, including a neuropsychological evaluation where appropriate and available, is recommended to assist in determining the patient's ability to meet the needs of their current or potential employment requirements and contribute to vocational planning	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
9.14.3 Results of assessments should be incorporated into the individualized patient goal-setting and planning for return to the community following stroke	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
9.14.4 Vocational counsellors, social workers and other team members should provide counselling and information to patients on employment benefits and legal rights. Referral should be initiated to social work, occupational therapy, and/or vocational counsellors as appropriate to assist patients and families in re-engaging in vocational activities as part of transitions to the community	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
Abbreviations: ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; CCAC, Community Care Access Centre; DoD, Department of Defence; HQO, Health Quality Ontario; IADL, instrumental activity of daily living; LHIN, Local Health Integration Network; OSN, Ontario Stroke Network; QBP, Quality-Based Procedure; RAI, Resident Assessment Instrument; RNAO, Registered Nurses' Association of Ontario; SIGN, Scottish Intercollegiate Guideline Network; VA, Veterans Affairs.	

## 9b: Recommendations for Mood and Cognition

Module 9b Recommended Practices	Contributing Sources of Evidence
<b>9.15 Psychosocial support</b>	
9.15.1 Short-stay postacute medical discharge patients who undergo assessment using interRAI should be triaged to appropriate psychosocial services	Consistent with the QBP Clinical Handbook for Homecare
<b>9.16 Depression</b>	
9.16.1 Screening should take place during early rehabilitation and before discharge to the community, and whenever clinical presentations occur	Based on and modified by expert advisory panel consensus, in reference to acute episode-of-care modules (Modules 1–5a); consistent with CSBPR, SIGN, Australia, and VA/DoD
9.16.2 Patients identified as being at risk for depression during screening should be further assessed by a health care professional with expertise in the diagnosis and management of depression in stroke patients. If required, a referral should be made to an appropriate mental health care specialist (e.g., psychiatrist or psychologist). Further assessment by the mental health care professional should include:	Taken from CSBPR (level C evidence)
<ul style="list-style-type: none"> <li>more in-depth interviews for assessment and diagnosis based on accepted diagnostic criteria (e.g., <i>Diagnostic and Statistical Manual of Mental Disorders</i> (56))</li> </ul>	Taken from CSBPR (level B evidence)
<ul style="list-style-type: none"> <li>population-specific assessment measures (e.g., children, elderly, persons with comorbid neuropsychiatric conditions)</li> </ul>	Taken from CSBPR (level C evidence)
<ul style="list-style-type: none"> <li>determination of appropriate course of treatment and individualized management plan</li> </ul>	Based on expert advisory panel consensus
<ul style="list-style-type: none"> <li>post-treatment assessment and follow-up as needed</li> </ul>	Based on expert advisory panel consensus
<b>9.17 Emotional lability/behavioural changes</b>	
9.17.1 Patients exhibiting extreme behavioural changes and/or emotional lability following stroke (i.e., pathological crying/tearfulness) should be given a trial of antidepressant medication if no contraindication exists. SSRIs are recommended in this patient population	Based on VA/DoD (level A evidence); consistent with CSBPR and Australia
9.17.2 Patients who do not require medication should be referred to a health care professional to address any potential changes in behaviour, functional activities, participation, and quality of life	Based on expert advisory panel consensus
<b>9.18 Vascular cognitive impairment and dementia</b>	
9.18.1 Patients with identified cognitive impairments should be referred to a specialist for additional cognitive or neuropsychological assessments to guide management	Based on CSBPR (level B evidence); modified by the expert advisory panel
Experts in neurocognitive assessment may include a neuropsychologist, a psychologist, an occupational therapist, a speech-language pathologist, a clinical nurse specialist, a psychiatrist, a physiatrist, a geriatrician, and a neurologist	Based on expert advisory panel consensus.
9.18.2 Interventions should be tailored according to the following considerations:	Taken from CSBPR (level B evidence)
<ul style="list-style-type: none"> <li>Goals should be patient-centred and sensitive to the values and expectations of the patient, family, and caregivers</li> <li>Goals should be developed in the context of both the cognitive impairments and patients' intact cognitive abilities, with the aim of facilitating resumption of desired activities and participation (e.g., self-care, home management, leisure, social roles, driving, volunteer participation, financial management, return to work)</li> </ul>	
<b>9.19 Sexuality</b>	

Module 9b Recommended Practices	Contributing Sources of Evidence
<p>9.19.1 Stroke survivors and their partners should be offered:</p> <ul style="list-style-type: none"> <li>the opportunity to discuss issues relating to sexuality with an appropriate health care professional</li> <li>written information addressing issues relating to sexuality after stroke</li> </ul>	<p>Taken from Australia (level GPP evidence); consistent with CSBPR and VA/DoD</p>
<p>9.19.2 Sexual issues should be discussed during rehabilitation and addressed again after transition to the community when the poststroke patient and partner are ready</p>	<p>Taken from VA/DoD (no level of evidence provided); consistent with CSBPR and Australia</p>
<p>Abbreviations: Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; QBP, Quality-Based Procedure; RAI, Resident Assessment Instrument; SIGN, Scottish Intercollegiate Guideline Network; SSRI, selective serotonin reuptake inhibitor; VA, Veterans Affairs.</p>	

## 9c: Recommendations for Swallowing, Nutrition/Hydration, and Communication

Module 9c Recommended Practices	Contributing Sources of Evidence
<b>9.20 Dysphagia</b>	
9.20.1 Patients undergoing active rehabilitation should be given as much therapy for dysphagia difficulties as they can tolerate, within reason	Based on Australia (level C evidence); modified by expert advisory panel
9.20.2 Patients with chronic oral-pharyngeal dysphagia should be seen for regular reassessment to ensure the effectiveness and appropriateness of a modified-texture diet, the continued need for compensations, and/or modification of rehabilitative techniques. This includes reassessment of swallowing patients on enteral feeds	Based on VA/DoD; modified by the expert advisory panel
9.20.3 Patients with new or worsening dysphagia should be referred to a speech-language pathologist	Based on expert advisory panel consensus in reference to the CCAC OBP
9.20.4 Effective mouth care should be given to people with difficulty swallowing after stroke (see recommendation 4c4 for more details)	Taken from NICE (level B evidence)
<b>9.21 Dysarthria</b>	
9.21.1 Patients with dysarthria should be referred to a speech-language pathologist for assessment and management	Taken from SIGN (level D evidence)
<b>9.22 Aphasia</b>	
9.22.1 Patients with known or suspected communication difficulties after stroke should be referred to a speech-language pathologist and be offered treatment (if there is potential for improvement)	Based on NICE; modified by the expert advisory panel; agreed upon by CSBPR
9.22.2 Treatment for aphasia should include individualized therapy, group therapy, or conversation groups, as appropriate	Taken from CSBPR (level B evidence)
9.22.3 Groups should be trained and guided by volunteers and caregivers overseen by a speech-language pathologist to supplement the intensity of therapy after discharge	Taken from CSBPR (level B evidence)
9.22.4 Families of persons with aphasia should be engaged in the entire process, from screening to intervention, including family education and training in supported communication	Taken from CSBPR (level C evidence)
<b>9.23 Oral hygiene</b>	
9.23.1 All patients, particularly those with swallowing difficulties and including those who are NPO, should have assistance and/or education on maintaining good oral and dental hygiene	Based on Australia (level GPP evidence); modified by the expert advisory panel
<b>9.24 Nutrition and hydration</b>	
9.24.1 All patients at nutritional risk identified by standardized screening tool on hospital admission should be assessed by a registered dietitian and receive nutrition counselling during hospitalization. Before discharge, these patients should be given a comprehensive nutrition care plan, including written instructions on nutritional interventions at home, and follow-up appointments with primary care providers, outpatient dietitians and/or home care dietitians, as clinically indicated	Consistent with the QBP Clinical Handbook for Homecare
9.24.2 Care coordinators should use interRAI to assess the needs of home care dietitian services for postacute medical discharge patients	Consistent with the QBP Clinical Handbook for Homecare
9.24.3 The following patients should be referred for an individualized nutritional assessment by a registered dietitian, either through an outpatient subspecialty clinic, primary care, or home care: <ul style="list-style-type: none"> <li>• frail elderly patients</li> <li>• patients with unintended weight loss or large fluctuations in weight</li> <li>• patients with significant comorbidities affecting nutrition</li> </ul>	Based on expert panel consensus; consistent with the QBP Handbook for Homecare
9.24.4 For patients who require home care nutrition services, the registered dietitian should assess food access and availability at home, assess nutritional risk, provide/reinforce counselling on medical nutrition interventions, and assist with weight management,	Consistent with the QBP Clinical Handbook for Homecare

Module 9c Recommended Practices	Contributing Sources of Evidence
developing individualized goals based on medical conditions	
9.24.5 Nutritional supplementation should be offered to people whose nutritional status is poor or deteriorating. Fluid supplementation should be offered to those who are dehydrated or who require it	Based on Australia (level A evidence); consistent with CSBPR and VA/DoD
Abbreviations: Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; CCAC, Community Care Access Centre; DoD, Department of Defence; NICE, National Institute for Health and Care Excellence; NPO, <i>nil per os</i> (nothing by mouth); OBP, outcomes-based procedures; QBP, Quality-Based Procedure; RAI, Resident Assessment Instrument; SIGN, Scottish Intercollegiate Guideline Network; VA, Veterans Affairs.	

## 9d: Recommendations for Physical Activity, Fitness, and ADLs

Module 9d Recommended Practices	Contributing Sources of Evidence
<b>9.25 Physical activity counselling</b>	
9.25.1 Physical activity should be promoted consistently by all health care providers involved in the care of a patient	Consistent with the QBP Clinical Handbook for Homecare
9.25.2 Patients should be physically active or engage in regular exercise that does not produce uncomfortable symptoms	Consistent with the QBP Clinical Handbook for Homecare
<b>9.26 Apraxia</b>	
9.26.1 For people with confirmed apraxia, tailored interventions (e.g., strategy training) are used to improve ADLs	Taken from Australia (level C evidence)
<b>9.27 ADL interventions</b>	
9.27.1 Individuals who exhibit ADL/IADL deficits should be given a training program that is tailored to their individual needs and anticipates the discharge setting	Based on VA/DoD (level I evidence); modified by the expert advisory panel
9.27.2 People who have difficulties in ADLs after stroke should have regular monitoring and treatment by occupational therapists with core skills and training in the analysis and management of ADLs. Treatment should continue until the person is stable or able to progress independently. See recommendation 9.5 for more detail.	Taken from NICE
<b>9.28 Functional ambulation training</b>	
9.28.1 Gait-oriented physical training should be offered to all patients assessed as medically stable and functionally safe to participate, when the goal of treatment is to improve functional ambulation	Taken from SIGN (level A evidence)
<b>9.29 Aerobic exercise</b>	
9.29.1 After appropriate medical evaluation, patients should regularly participate in an aerobic exercise program that accounts for the patient's comorbidities and functional limitations to improve gait speed, endurance, stroke risk factor profile, mood, and cognitive abilities	Taken from CSBPR (level B evidence); based on <a href="#">Cardiovascular and Aerobic Exercise in Postacute Stroke Patients: A Rapid Review</a>
<b>9.30 Task-oriented circuit training</b>	
9.30.1 Task-oriented circuit training is recommended to improve transfer skills, mobility, and ADLs/functional tasks	Taken from CSBPR (level C evidence); consistent with Australia
<b>9.31 Intensity and duration of intervention</b>	
9.31.1 Stroke patients should receive 3 visits per week for an average of 60 days per each rehabilitation discipline (occupational therapy, physiotherapy, speech-language pathology), in accordance to the patients' individual complexities and needs. Patients should also be seen by other interdisciplinary team members (personal support worker, social worker, etc.) as needed. Further intervention may be required based on patients' residual needs	Based on expert advisory panel consensus

Abbreviations: ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; HQO, Health Quality Ontario; IADL, instrumental activity of daily living; NICE, National Institute for Health and Care Excellence; QBP, Quality-Based Procedure; SIGN, Scottish Intercollegiate Guideline Network; VA, Veterans Affairs.

## 9e: Recommendations for Upper Extremity Management

Module 9e Recommended Practices	Contributing Sources of Evidence
<b>9.32 Swelling of upper extremities</b>	
9.32.1 For people who are immobile, management can include the following interventions to prevent swelling in the hand and foot:	
• dynamic pressure garments	Taken from Australia (level C evidence)
• electrical stimulation	Taken from Australia (level C evidence)
• active or active-assisted exercises in conjunction with arm elevation	Based CSBPR (level C evidence); modified by the expert advisory panel
• retrograde massage	Taken from CSBPR (level C evidence)
• gentle grade 1–2 mobilizations for accessory movements of the hand and fingers	Taken from CSBPR (level C evidence)
<b>9.33 Repetitive task training</b>	
9.33.1 Repetitive task training should be offered after stroke on a range of tasks for upper-limb weakness	Taken from NICE
9.33.2 Patients should engage in training that is meaningful, engaging, progressively adapted, task-specific, and goal-oriented in an effort to enhance motor control and restore sensorimotor function	Taken from CSBPR (level A evidence)
9.33.3 Training should encourage use of patients' involved affected limb during functional tasks and be designed to simulate partial or whole skills required in ADLs (e.g., folding, buttoning, pouring and lifting)	Taken from CSBPR (level A evidence)
<b>9.34 Spasticity management</b>	
9.34.1 Spasticity and contractures can be prevented or treated by antispasticity pattern positioning, range-of-motion exercises and/or stretching	Taken from CSBPR (level C evidence)
9.34.2 Routine use of splinting of the upper limb to reduce spasticity in the wrist and finger flexors following stroke is not recommended	Taken from SIGN (level B evidence); consistent with CSBPR
<b>9.35 Functional electrical stimulation</b>	
9.35.1 FES should be used to increase pain-free range of motion for the lateral rotation of the shoulder	Taken from CSBPR (level A evidence)
9.35.2 Shoulder mobility should be monitored and maintained during rehabilitation. Subluxation can be reduced and pain decreased using FES applied to the shoulder girdle	Taken from VA/DoD (level B evidence)
9.35.3 FES should be used for the wrist and forearm to reduce motor impairment and improve functional motor recovery	Taken from CSBPR (level A evidence)
<b>9.36 EMG biofeedback/sensory stimulation</b>	
9.36.1 EMG biofeedback should not be used on a routine basis	Taken from CSBPR (level A evidence); consistent with SIGN
9.36.2 Sensory stimulation (e.g., TENS, acupuncture, muscle stimulation, biofeedback) for the upper extremity should be offered to select patients to improve sensory motor function	Taken from CSBPR (level A evidence)
<b>9.37 Constraint-induced movement therapy</b>	
9.37.1 CIMT shows short-term effectiveness on arm function and should be considered in the stroke rehabilitation regimen beginning no earlier than 1 month after the onset of stroke (may be influenced by stroke severity and stage of recovery)	Expert panel consensus; based on Constraint-Induced Movement Therapy for Rehabilitation of Arm Dysfunction after Stroke in Adults: An Evidence-Based Analysis (20)

Module 9e Recommended Practices	Contributing Sources of Evidence
9.37.2 Intensive CIMT should be used for patients who demonstrate at least 20 degrees of wrist extension and 10 degrees of finger extension, with minimal sensory or cognitive deficits. Intensive training should involve restraint of unaffected arm for at least 90% of waking hours, and at least 6 hours a day of intense upper extremity training of the affected arm for 2 weeks	Taken from CSBPR (level A evidence)
9.37.3 Modified CIMT should be used for patients who demonstrate at least 20 degrees of wrist extension and 10 degrees of finger extension, with minimal sensory or cognitive deficits. Modified CIMT consists of constraint of the unaffected arm with a padded mitt or arm sling for a minimum of 6 hours a day with 2 hours of therapy for 14 days	Taken from CSBPR (level A evidence)
9.37.4 Given the intensity and duration of CIMT, it should be pursued only if the service provider finds this to be realistic and necessary for the patient	Based on expert advisory panel consensus
9.37.5 The following OHTAC recommendations for CIMT (20) should be considered: <ul style="list-style-type: none"> <li>• CIMT shows short-term effectiveness on arm function and should be considered in the stroke rehabilitation regimen beginning no earlier than 1 month after the onset of stroke</li> <li>• Contextualization of these findings in terms of the management of stroke rehabilitation in Ontario is required</li> <li>• OHTAC supports the 2010 ICES Ontario Stroke Evaluation Report (15) recommendations regarding access and tracking of outpatient stroke rehabilitation care in the province</li> </ul>	Based on HQO's Constraint-Induced Movement Therapy for Rehabilitation of Arm Dysfunction after Stroke in Adults: An Evidence-Based Analysis (20) (very low to moderate quality of evidence); consistent with Australia (level C evidence)
<b>9.38 Graded repetitive arm supplementary program</b>	
9.38.1 Therapists should provide GRASP for patients to increase activity at home. This program should include strengthening of arm and hand; range of motion; gross/fine-motor skills; and repetitive goal and task-oriented activities designed to simulate partial or whole skills required for ADLs. The GRASP protocol suggests 1 hour per day, 6 days per week	Taken from CSBPR (early level A evidence; late level C evidence)
<b>9.39 Oral antispasticity agents</b>	
9.39.1 A prescription of benzodiazepines during stroke recovery period is not recommended	Taken from CSBPR (level B evidence); consistent with VA/DoD
9.39.2 Oral agents such as tizanidine and oral baclofen should be used for spasticity, especially if the spasticity is associated with pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients	Taken from VA/DoD (level B evidence); consistent with CSBPR
<b>9.40 Chemodenervation</b>	
9.40.1 Clostridium botulinum toxin type A should be used to relieve spasticity where it is causing pain or interfering with physical function and the ability to maintain hand hygiene	Taken from SIGN (level A evidence); consistent with CSBPR, VA/DoD, and Australia
<b>9.41 Joint-protection strategies</b>	
9.41.1 Joint-protection strategies should include: <ul style="list-style-type: none"> <li>• positioning and supporting the limb to minimize pain</li> <li>• protection and support for the limb during functional mobility tasks using slings, a pocket, or by a therapist during wheelchair use by using hemi-tray or arm troughs</li> <li>• protecting and supporting the arm during wheelchair use by using a hemi-tray or arm trough</li> <li>• during the flaccid stage, slings can be used to prevent injury during transfers and mobility; however, beyond the flaccid stage the use of slings remains controversial</li> </ul>	<p>Taken from CSBPR (level B evidence)</p> <p>Taken from CSBPR (level C evidence)</p> <p>Taken from CSBPR (level C evidence)</p> <p>Taken from CSBPR (level C evidence)</p>
9.41.2 The arm should not be moved beyond 90 degrees of shoulder flexion or abduction, unless the scapula is upwardly rotated and the	Taken from CSBPR (level A evidence)

Module 9e Recommended Practices	Contributing Sources of Evidence
humerus is laterally rotated	
9.41.3 Patients and staff should be educated to correctly position and handle the involved arm	Taken from CSBPR (level A evidence)
For example, excessive traction should be avoided during assisted movements such as transfers	Taken from CSBPR (level C evidence)
<b>9.42 Overhead pulleys</b>	
9.42.1 Use of overhead pulleys is not recommended	Taken from SIGN (level A evidence); consistent with CSBPR
<b>9.43 Virtual reality</b>	
9.43.1 Where available, virtual reality techniques—using both immersive techniques (such as virtual reality) and nonimmersive techniques (such as video games)—can be used as an adjunct to other rehabilitation therapies as a means of providing additional opportunities for repetition, intensity, and task-oriented training	Taken from CSBPR (level B evidence); consistent with SIGN, VA/DoD, and Australia
<b>9.44 Mental imagery</b>	
9.44.1 Following assessment to determine if a patient is a suitable candidate, patients should be encouraged to engage in mental imagery to enhance upper-limb sensorimotor recovery	Taken from CSBPR (early level A evidence; late level B evidence)
Abbreviations: ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; CIMT, constraint-induced movement therapy; DoD, Department of Defence; EMG, electromyographic; FES, functional electrical stimulation; GRASP, Graded repetitive arm supplementary program; NICE, National Institute for Health and Care Excellence; OHTAC, Ontario Health Technology Advisory Committee; SIGN, Scottish Intercollegiate Guideline Network; TENS, transcutaneous electrical nerve stimulation; VA, Veterans Affairs.	

## 9f: Recommendations for Shoulder and Central Pain

Module 9f Recommended Practices	Contributing Sources of Evidence
<b>9.45 Subluxation</b>	
9.45.1 For people with severe weakness who are at risk of developing a subluxed shoulder, management should include 1 or more of the following interventions:	
• electrical stimulation	Taken from Australia (level B evidence)
• firm support devices	Consistent with VA/DoD
• education and training for the patient, family/carer and clinical staff on how to correctly handle and position the affected upper limb	Taken from Australia (level GPP evidence)
9.45.2 For people who have developed a subluxed shoulder, management may include firm support devices to prevent further subluxation	Taken from Australia (level C evidence)
<b>9.46 Assessment and prevention of hemiplegic shoulder pain</b>	
9.46.1 Information on how to prevent pain or trauma to the shoulder should be provided to patients (and their families and carers) if they are at risk of developing shoulder pain	Taken from NICE
9.46.2 The assessment of the painful hemiplegic shoulder should include evaluation of tone, strength, changes in length of soft tissues, alignment of joints of the shoulder girdle, and orthopedic changes in the shoulder	Taken from CSBPR (level C evidence)
<b>9.47 Management of hemiplegic shoulder pain</b>	
9.47.1 For people with severe weakness who are at risk of developing shoulder pain, management should include:	
• shoulder strapping	Taken from Australia (level B evidence)
• interventions to educate staff, caregivers, and people with stroke about preventing trauma	Taken from Australia (level GPP evidence)
9.47.2 Treatment of hemiplegic shoulder pain related to limitations in range of motion should include gentle stretching and mobilization techniques, and typically should involve increasing external rotation and abduction	Taken from CSBPR (level B evidence)
• Active range of motion should be increased gradually in conjunction with restoring alignment and strengthening weak muscles in the shoulder girdle	Taken from CSBPR (level B evidence)
9.47.3 If there are no contraindications, analgesics (such as acetaminophen or ibuprofen) can be used for pain relief	Taken from CSBPR (level C evidence)
9.47.4 Injections of botulinum toxin into the subscapularis and pectoralis muscles can be used to treat hemiplegic shoulder pain thought to be related to spasticity	Taken from CSBPR (level B evidence)
9.47.5 Subacromial corticosteroid injections can be used in patients when pain is thought to be related to injury or inflammation of the subacromial region (rotator cuff or bursa) in the hemiplegic shoulder	Taken from CSBPR (level A evidence)
9.47.6 In a subset of patients who experience pain related to both injury or inflammation and spasticity, dual therapy (botulinum toxin plus steroid injections) should be used	Taken from CSBPR (level C evidence)
<b>9.48 Central poststroke pain</b>	
9.48.1 Any patient whose central poststroke pain is not controlled within a few weeks should be referred to a health care provider with expertise in treating poststroke neuropathic pain (e.g., a specialist pain management team, neurologist, or physiatrist)	Based on Australia (level GPP evidence); modified by the expert advisory panel
<b>9.49 General pain management</b>	
9.49.1 A pain management plan should be recommended that includes assessment of the following:	Taken from VA/DoD (level C evidence)

Module 9f Recommended Practices	Contributing Sources of Evidence
<ul style="list-style-type: none"> <li>likely etiology (i.e., musculoskeletal and neuropathic)</li> <li>pain location</li> <li>quality, quantity, duration, intensity, and aggravating and relieving factors</li> </ul>	
9.49.2 Balancing the benefits of pain control with possible adverse effects of medications on an individual's ability to participate in and benefit from rehabilitation should be recommended	Taken from VA/DoD (level I evidence)
9.49.3 Clinicians should tailor the pain treatment to the type of pain	Taken from VA/DoD (level C evidence)
9.49.4 When appropriate, nonpharmacologic modalities should be used for pain control, such as biofeedback, massage, imaging therapy, and physical therapy	Taken from VA/DoD (level C evidence)
<b>9.50 Shoulder movement</b>	
9.50.1 The shoulder should not be passively moved beyond 90 degrees of flexion and abduction unless the scapula is upwardly rotated and the humerus is laterally rotated	Taken from CSBPR (level A evidence)
Abbreviations: Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; NICE, National Institute for Health and Care Excellence; VA, Veterans Affairs.	

## 9g: Recommendations for Lower Extremity Mobility

Module 9g Recommended Practices	Contributing Sources of Evidence
<b>9.51 Treadmill training</b>	
9.51.1 BWSTT should be used when other strategies for walking practice are unsuccessful in patients with low ambulatory function. Evidence is in favour of such repetitive task-oriented and task-specific training	Based on CSBPR (level B evidence); modified by the expert advisory panel
9.51.2 If available, treadmill-based gait training (without body support) should be used to enhance walking speed, endurance, and walking distance. Treadmill training is suggested for 30 minutes, 5 days per week for 2 to 3 weeks	Taken from CSBPR (early level C evidence; late level B evidence); modified by the expert advisory panel; consistent with VA/DoD and NICE
9.51.3 Treadmill training is a type of repetitive task training (see recommendation 9.52). If it is unavailable in a patient's home, other forms of repetitive task training should be used	Based on expert advisory panel consensus
<b>9.52 Repetitive task training</b>	
9.52.1 Repetitive task training should be offered after stroke on a range of tasks for upper- and lower-limb weakness	Taken from NICE
9.52.2 Patients should engage in training that is meaningful, engaging, progressively adapted, task-specific, and goal-oriented in an effort improve transfer skills and mobility	Based on CSBPR (level A evidence); modified by the expert advisory panel
9.52.3 Training should encourage use of patients' involved affected limb during functional tasks and be designed to simulate partial or whole skills required in ADLs (e.g., all lower-extremity tasks, including sit-to-stand, walking, stair climbing, and stepping)	Based on CSBPR (level A evidence); modified by the expert advisory panel
<b>9.53 Spasticity and oral antispasticity agents</b>	
9.53.1 Spasticity and contractures should be treated or prevented by antispastic pattern positioning, range-of-motion exercises, and/or stretching	Taken from CSBPR (level C evidence)
9.53.2 Benzodiazepines should not be prescribed during the stroke recovery period	Taken from VA/DoD (level B evidence); consistent with CSBPR
9.53.3 Benzodiazepines should be avoided due to sedating side effects, which may impair recovery	Taken from CSBPR (level C evidence)
9.53.4 The presence of spasticity should not limit the use of strength training in the leg	Taken from CSBPR (level C evidence)
<b>9.54 Chemodenervation</b>	
9.54.1 Chemodenervation using clostridium botulinum toxin type A should be used in patients with focal and/or symptomatically distressing spasticity to increase range of motion, improve gait, and decrease pain	Based on CSBPR (early level C evidence; late level A evidence); modified by expert advisory panel consensus; consistent with SIGN, VA/DoD, and Australia
<b>9.55 Ankle-foot orthoses</b>	
9.55.1 Lower-extremity orthotic devices can be used when ankle stabilization is required to help the patient walk. Prefabricated bracing can be used initially, while customized bracing should be reserved for patients with anticipated long-term need	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with VA/DoD
9.55.2 Where the aim of the treatment is to have an immediate improvement on walking speed, efficiency of gait pattern, or weight bearing during stance, patients should be assessed for suitability of ankle-foot orthoses by an appropriate qualified health care professional	Taken from SIGN (level C evidence); consistent with CSBPR, VA/DoD NICE, and Australia
9.55.3 Selected patients, including those with foot drop, need individual fitting and a follow-up to verify its effectiveness	Based on Australia (level C evidence); modified by the expert advisory panel
9.55.4 Adaptive devices should be used for safety and function if other methods of performing the task are not available or cannot be learned, or if the patient's safety is a concern	Taken from VA/DoD (level C evidence)
<b>9.56 Wheelchairs and other special equipment</b>	

Module 9g Recommended Practices	Contributing Sources of Evidence
9.56.1 The need for gait aids, assistive devices, wheelchairs, seating, and other special equipment should be evaluated by an occupational therapist or physiotherapist on an individual basis	Taken from CSBPR (level C evidence)
9.56.2 Prescription or purchase of a long-term device should be based on anticipation of long-term need	Taken from CSBPR (level C evidence)
9.56.3 Once provided, patients should be reassessed, as appropriate, to determine if changes are required or equipment can be discontinued	Taken from CSBPR (level C evidence)
<b>9.57 Functional electrical stimulation</b>	
9.57.1 FES should be considered for use in improving muscle force, strength, and function in selected patients but the effects may not be sustained	Based on CSBPR (level A evidence); modified by the expert advisory panel; consistent with SIGN and VA/DoD
<b>9.58 Deep vein thrombosis</b>	
9.58.1 Patients at high risk for venous thromboembolism should be started immediately on venous thromboembolism prophylaxis	Taken from CSBPR (level A evidence)
9.58.2 Low molecular weight heparin should be considered for patients with acute ischemic stroke at high risk for venous thromboembolism or unfractionated heparin for patients with renal failure	Taken from CSBPR (level B evidence)
9.58.3 Use of antiembolism stockings is not recommended	Taken from CSBPR (level A evidence)
Abbreviations: ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; BWSTT, body weight supported treadmill training; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; FES, functional electrical stimulation; NICE, National Institute for Health and Care Excellence; SIGN, Scottish Intercollegiate Guideline Network; VA, Veterans Affairs.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 9 Implementation Considerations
<p><b>General considerations</b></p> <p><i>Interprofessional team</i></p> <ul style="list-style-type: none"> <li>Stroke rehabilitation should be provided by an interprofessional team with specialized stroke training and expertise/skills</li> <li>Resources should be available in the community to encourage timely access and required intensity of service. Physiotherapy, occupational therapy, and speech-language therapy should each be provided 3 times weekly, for a total of 9 visits distributed over 7 days per week</li> </ul> <p><i>Rehabilitation</i></p> <ul style="list-style-type: none"> <li>Patient rehabilitation progress should be reviewed at 8 weeks after hospital discharge and adjusted accordingly</li> <li>Community-based exercise programs should be made available to all stroke patients. In addition to promoting recovery and secondary stroke prevention, exercise also helps prevent the loss of recovery gained in therapy. The importance of regular exercise should be stressed at all levels of patient care. (Based on OHTAC recommendation from Optimizing Chronic Disease Management in the Community [Outpatient] Setting [OCDM]: An Evidentiary Framework (24) and the Guidelines for Community Based Exercise Programs for People with Stroke (51))</li> <li>While a patient may require 8 or more weeks of rehabilitation program after hospital discharge, the 8 weeks may not be consecutive. Funding mechanisms should be put in place to reflect patient need and total rehabilitation program requirements instead of being time-based</li> <li>Community-based programs should be centralized to maximize efficient and effective use of resources. Where a centralized program (facility/practitioner-based) is not available or feasible, home-based rehabilitation should be provided</li> </ul> <p>Abbreviations: OHTAC, Ontario Health Technology Advisory Committee.</p>

## Module 10: Cross-Continuum Processes

This module emphasizes the importance of certain elements of care at all points of the postdischarge trajectory. Many components of care should be ongoing and evolving, rather than received all at once. As patient and caregiver needs change, goals should be reassessed, tracked, and refined, patients and caregivers should be supported throughout the patient's community reintegration.

Module 10 Recommended Practices	Contributing Sources of Evidence
<b>10.1 General assessments</b>	
10.1.1 Stroke patients with residual physical activity, ADLs, or mobility limitations should be assessed for targeted rehabilitation	Based on CSBPR (level A evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
10.1.2 Stroke patients living in the community should have regular and ongoing follow-up by a specialized team to assess recovery, prevent deterioration, maximize functional and psychosocial outcomes, and improve quality of life	Based on CSBPR (level B evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
10.1.3 Survivors and caregivers should have their individual psychosocial and support needs reviewed on a regular basis	Based on CSBPR (level A evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
10.1.4 Stroke patients and caregivers should be monitored and assessed for depression	Based on CSBPR (level C evidence); modified by the expert advisory panel; consistent with VA/DoD and Australia
10.1.5 Health services with a stroke unit should provide comprehensive, experienced interprofessional community rehabilitation and adequately resourced support services for stroke patients and their families/caregivers	Based on Australia (level A evidence); modified by the expert advisory panel
<b>10.2 Goal-setting</b>	
10.2.1 The patient, family, and caregiver should drive goal-setting. Goals should be meaningful while targeting impairments, activities, and participation. Goals should be challenging but achievable and include both short and long-term elements	Based on Australia (level GPP evidence) and NICE (level B evidence); modified by the expert advisory panel
<b>10.3 Patient and family education</b>	
10.3.1 Patients with stroke and their families should be educated at all stages of stroke care. Education should be interactive, relevant to the patient's specific needs and stage of stroke, and available in different languages	Based on and modified by expert advisory panel consensus, in reference to the acute episode-of-care modules (Modules 1–5a); consistent with CSBPR, NICE, and Australia
10.3.2 Patient education should promote self-efficacy, personal care techniques, self-management, communication strategies, and physical handling techniques	Based on CSBPR (level B evidence); modified by the expert advisory panel; consistent with the HQO rapid review on self-management and educational intervention in the postacute population: <ul style="list-style-type: none"> <li>For postacute stroke patients, moderate quality of evidence shows that the majority of RCTs report a protective effect in favour of self-management for health-related quality of life</li> </ul>
<b>10.4 Education and training for team</b>	
10.4.1 Members of the interprofessional stroke team should receive education and training to promote stroke expertise	Based on SIGN (level B evidence); modified by the expert advisory panel
<b>10.5 Stroke survivor support</b>	
10.5.1 Stroke patients and family/caregivers should be given information about the availability and potential benefits of a local stroke support group and/or other sources of peer support when in the community	Based on Australia (level GPP evidence); modified by the expert advisory panel

Module 10 Recommended Practices	Contributing Sources of Evidence
<p>10.5.2 Support should include:</p> <ul style="list-style-type: none"> <li>written discharge instructions from health care providers that identify action plans, follow-up care, and goals; they should be given to the patient, family, and primary caregiver</li> <li>access to a contact person in the hospital or community (e.g., designated social worker, case manager or system navigator) for postdischarge queries</li> <li>access to and advice from health and social service organizations appropriate to their needs and stage of transition and recovery (ideally through a single point of access where available)</li> <li>referrals to community support service agencies, such as stroke survivor groups, peer survivor visiting programs, meal provider agencies, and other services and agencies</li> </ul>	<p>Based on CSBPR (level B evidence); modified by the expert advisory panel</p> <p>Based on CSBPR (level B evidence); modified by the expert advisory panel</p> <p>Based on CSBPR (level C evidence); modified by the expert advisory panel</p> <p>Based on CSBPR (level C evidence); modified by the expert advisory panel</p>
<b>10.6 Caregiver and family support</b>	
<p>10.6.1 Based on interRAI and care coordinator assessment or another assessment tool, caregiver or family support interventions should continue to be supported and tailored to the individual needs of the patient and caregivers through increased communication and coordination among service providers</p> <p>10.6.2 Family counselling focused on psychosocial and emotional issues and role adjustment should be encouraged and made available to patients and their family members upon discharge</p> <p>10.6.3 Support for patients, families, and informal caregivers should begin at the time of admission and continue throughout the postacute health care episode until discharge to the next health care setting or back to the community (either from the emergency department, acute care or inpatient rehabilitation, and with or without home support services in place at time of discharge)</p> <ul style="list-style-type: none"> <li>This support should be available on an ongoing basis throughout community reintegration, or as needed</li> </ul>	<p>Consistent with the QBP Clinical Handbook for Homecare</p> <p>Consistent with the QBP Clinical Handbook for Homecare</p> <p>Based on CSBPR (level B evidence); modified by the expert advisory panel; consistent with evidence from the Southwest LHIN Community Rehabilitation Team</p> <p>Based on expert advisory panel consensus; consistent with the evidence from the Southwest LHIN Community Rehabilitation Team</p>
<b>10.7 Falls prevention and management</b>	
<p>10.7.1 Multifactorial interventions in the community, including an individually prescribed exercise program, should be provided for people who are at risk of falling</p> <p>10.7.2 In addition to exercise, the following interventions should be made available to or promoted for use by community-dwelling persons, who are at high risk for falls:</p> <ul style="list-style-type: none"> <li>environmental modifications in high-risk populations</li> <li>use of gait-stabilizing devices outdoors in the mobile elderly</li> </ul>	<p>Based on Australia (level B evidence); modified by the expert advisory panel</p> <p>Taken from the OHTAC recommendation for Optimizing Chronic Disease Management, but revised for the purposes of stroke</p>
<b>10.8 Medication management</b>	
<p>10.8.1 Interventions to promote adherence with medication regimes should include combinations of the following:</p> <ul style="list-style-type: none"> <li>reminders and self-monitoring</li> <li>reinforcement and counselling</li> <li>family therapy</li> <li>telephone follow-up</li> <li>supportive care</li> <li>dose administration aids</li> <li>information and education in hospital and in the community</li> </ul> <p>10.8.2 Medication reconciliation should be provided to patients at points of transition in care (e.g., discharge)</p> <p>10.8.3 Assessment of patient and medications should occur to ensure:</p>	<p>Based on Australia (level B evidence); modified by the expert advisory panel; consistent with <a href="#">Medication Reconciliation at Discharge: A Rapid Review</a></p> <p>Consistent with the QBP Clinical Handbook for Homecare</p> <p>Consistent with the QBP Clinical Handbook for Homecare</p>

Module 10 Recommended Practices	Contributing Sources of Evidence
<ul style="list-style-type: none"> <li>• optimization of prescribed medication</li> <li>• use of appropriate symptom-relief medications</li> <li>• adherence assessment (e.g., patients could be assessed with the Morisky 4-Item Medication Adherence Questionnaire; health care providers should address reasons for nonadherence where possible)</li> <li>• identification of potential medication discrepancies</li> </ul>	
10.8.4 Clinicians should allow for monitoring of medication targets, dosages, and adjustments to meet the goals of medication	Consistent with the QBP Clinical Handbook for Homecare
Abbreviations: ADL, activity of daily living; Australia, Australian Clinical Guidelines for Stroke Management; CSBPR, Canadian Stroke Best Practice Recommendations; DoD, Department of Defence; HQO, Health Quality Ontario; NICE, National Institute for Health and Care Excellence; OHTAC, Ontario Health Technology Advisory Committee; QBP, Quality-Based Procedure; RAI, Resident Assessment Instrument; SIGN, Scottish Intercollegiate Guideline Network; VA, Veterans Affairs.	

The following implementation considerations were noted by members of the expert advisory panel.

Module 10 Implementation Considerations
<p><b>General considerations</b></p> <p><i>Home</i></p> <ul style="list-style-type: none"> <li>• An intake worker should assess patients and caregivers before/immediately postdischarge. Community-based intake professionals should assess the patient and make appropriate referrals for treatment/care</li> <li>• Early referral to an occupational therapist/physiotherapist (ideally from the inpatient team or by community-based care coordinator) should be made to evaluate patients' functionality in their home and conduct a home safety assessment</li> <li>• Patients should have a structured exercise program, and it should be updated in the community</li> <li>• Medication management should be an integral part of patient education and self-management follow-up</li> <li>• Once finalized, the HQO/Health Transformation Secretariat Care Coordination initiative (38) should be adopted by all providers of community-based health services</li> <li>• A feedback loop should be developed between the community-based health care provider and the hospital-based referring health care provider to ensure patient follow-up. If the patient was seen, it should be noted in his/her hospital record</li> <li>• A standardized goal-setting framework and reporting system should be developed and implemented</li> <li>• A database of community services available to stroke patients should be developed at the LHIN level and made available to all patients, potentially building on existing infrastructure (e.g., Healthline) and using a variety of modalities to improve access and ease of use</li> </ul> <p><i>Skilled staff</i></p> <ul style="list-style-type: none"> <li>• Within every regional stroke network, health care providers who care for stroke patients should maintain competency in the treatment and care of stroke patients</li> <li>• Providers of services to stroke patients should be appropriately skilled and trained. A definition of what it means to be an "expert in stroke care" needs to be developed</li> <li>• Patients should be given direction on whom to call/where to go if they have questions or concerns, including if symptoms worsen (i.e., there should be more options other than to go to nearest ED)</li> </ul> <p><i>Mental health</i></p> <ul style="list-style-type: none"> <li>• Where there is an indication of mental illness or depression as scored in the interRAI assessment (or other assessment tool), referral for a full psychosocial assessment should be made to a trained, skilled professional</li> </ul> <p><i>Educational materials</i></p> <ul style="list-style-type: none"> <li>• Integrative educational materials used in the hospital and the community should be consistent and continually updated with patients and caregivers Once completed, the Canadian Stroke Best Practice Recommendations for Stroke Care working group documents on patient education should be considered as basis for hospital and community practice (43)</li> </ul>

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#### *Behaviour and lifestyle modification*

- Where required, behaviour and lifestyle modification should be made available, at no cost, to all patients and caregivers. Lifestyle behaviours that should be monitored include:
  - eating/nutrition counselling /modification
  - weight control
  - exercise
  - smoking cessation
  - alcohol restrictions
  - sodium intake
  - stress reduction
  - sleep modification therapy
- Behaviour modification/lifestyle therapies should be delivered by a health care professional with skills and training in behaviour modification

#### *Screening tool*

- A validated screening tool for sleep apnea should be developed and implemented

#### *Blood pressure*

- Patients should have their blood pressure monitored at every health care encounter and supplemented by home-based blood pressure monitoring if indicated
- Consider access to no-cost ambulatory blood pressure monitoring

#### *Smoking cessation*

- Smoking-cessation strategies that specifically target stroke patients should be developed and implemented. Targeted smoking-cessation materials and messaging should be emphasized to all patients with a chronic disease as smoking cessation in this patient group is shown to have a significant, positive, immediate clinical outcome
- NRT should be made a free benefit to any Ontario resident with a health card
- Public health departments should hand out free NRT under the “STOP” program; pharmacies should be permitted to do the same after screening patients
- Smoking-cessation drug therapy should be made available at no cost to all Ontarians with a prescription from a physician or from another health care professional who is under medical directive and trained in smoking cessation

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Abbreviations: ED, emergency department; HQO, Health Quality Ontario; LHIN, Local Health Integration Network; RAI, Resident Assessment Instrument.

# Implementation of Best Practices

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## Acute Episode of Care

- Many of the practices recommended by the expert advisory panel are not consistently tracked at either the local or provincial level; it is difficult to define the gap between current and ideal stroke practice, and how much this gap varies across organizations and parts of the province. A key objective for a stroke performance measurement strategy should be enabling organizations to track, audit, and evaluate implementation pathways and recommended practices. Through such monitoring, variances can be identified, progress monitored, and pathways refined.
- An administrative data set is needed to code and report outpatient visits; this can be used to educate and improve care. The expert advisory panel recommends that any increase in funding be tied to the collection of coded outpatient and rehabilitation visits.
- Currently there is minimal ability to evaluate outcomes and health system impacts associated with the implementation of EVT at a population level. Patients that have undergone EVT can be identified within administrative databases using a combination of Canadian Classification of Health Intervention (CCI) codes with appropriate ICD-10-CA codes (ischemic stroke) within the CIHI-DAD. However, the sensitivity and specificity of the coding within administrative data has not been determined. The data quality of this intervention will need to be monitored as the number of cases identified varies with CCI codes used with and without diagnostic codes. Education is needed for clinicians to improve clinical documentation and for coders to identify accurate source information.
- Capacity Planning is needed to develop access to EVT for patients living within regions where currently there is a greater than two (2) hour patient transfer time to an EVT Centre (e.g. identifying new potential EVT sites among current tPA thrombolysis centres and developing infrastructure and personnel; expanding Telestroke services; appropriate training of Neurointerventionalists).
- Many of the implementation considerations speak to the need to approach implementation not only at the level of individual patients and clinicians, but also within a program of care that requires organization-level planning, resourcing, and the involvement of administrators. Program design should also involve a measurement system for tracking performance and supporting quality improvement.
- The cost of treating an average stroke inpatient is often more than 10 times that of treating a stroke patient in the ED and then discharging him/her. If prices for the QBP funding system reflect these costs, care must be taken to ensure hospitals are not given the incentive to admit more patients. The QBP funding system can mitigate these risks by bundling payment across the ED and inpatient settings, and setting policies related to appropriateness. In the longer term, collecting new data that capture important patient complexity factors may allow these groups to be redefined based on patient characteristics rather than on utilization.
- Stroke patients are a heterogeneous population characterized by varying levels of severity in their underlying stroke, a high prevalence of comorbidities, and frequent presence of social issues and other factors that contribute to complexity. Ontario currently captures only a subset of the relevant variables necessary to account for stroke patient complexity in routine administrative data. Performing effective risk adjustment of QBP prices for justifiable cost variation across stroke patients will require collecting data related to these variables and incorporating that information into a costing analysis.

- The Ministry of Health and Long-Term Care was interested in advice from the expert advisory panel about capacity planning (including 7-day access to rehabilitation therapists) and shifts across care settings for stroke. The most important issue the expert advisory panel identified is inconsistent capacity in (and access to) stroke rehabilitation across the province. This is a major opportunity area for the ministry, Local Health Integration Networks (LHINs), hospitals, home care providers, and other providers to work together to improve outcomes for stroke patients and impact rates of unplanned readmissions.
- A province-wide initiative is recommended to reduce unable to determine stroke diagnosis (I64) to fewer than 2% of coded cases by the end of 2017.

# Postacute Episode of Care

The Expert Advisory Panel on Postacute Community-Based Care for Stroke Patients believes that implementation of best practices related to community-based stroke care will require significant investment. The following points highlight some of the key issues for and barriers to the successful implementation of the postacute stroke best practices discussed.

## Key Considerations

- This handbook considers the acute episode of care starting from presentation at the ED through to 60 days postdischarge. However, there is strong evidence that supports treatment and rehabilitation services beyond the 60-day period.
- Direction to EMS before presentation to the ED is key to ensuring access to appropriate level of stroke care.
- Patients (from both inpatient units and emergency department) should have follow-up arranged before discharge.
- A robust system/metrics of data capture and reporting is needed for processes and patient outcomes in the community, as well as outpatient/ambulatory hospital-based services.
- Moving appropriate patients to community or ambulatory care to achieve the associated cost efficiencies will not be possible until access to best practice outpatient stroke rehabilitation and community-based assessment/treatment and services post discharge capacity are available.
- Comprehensive packages of services are needed to target patients who have had a TIA or minor/mild stroke; patients who have had a moderate stroke; and patients who have had a severe stroke.

## General System-Wide Considerations

- A transitional approach to funding is recommended, to enable capacity-building in the community and to avoid the consequences of patients receiving no service. Incentive funding should be made available to initiate the significant change required to build equitable access to community-based/outpatient rehabilitation services.
- Limited community stroke rehabilitation services exist across the province; LHINs will need to be involved in community stroke rehabilitation capacity planning.
- Relevant, individualized patient education materials should be standardized and available in multiple languages. Education materials given to patients and caregivers at discharge should be used and reinforced by the home care team. Patients have expressed concerns that new educational materials distributed by home care service providers are confusing or in conflict with materials provided on discharge.
- The pathways to evidence-based recommendations in this report should be adopted by all providers. Provincial guidelines and pathways should be available in electronic format for primary care providers.
- Technology should be developed to allow transition of the care plan across the continuum of care and between providers.
- All hospitals should adopt the forthcoming health transformation discharge planning standards.
- Smoking cessation counselling should be made readily available at no cost to all patients and caregivers.

- Barriers to accessing drug therapy and nicotine replacement therapy should be removed.
- Patient self-management programs should be developed and incorporated into care plans.
- Monitoring of self-management care plans is a responsibility of all health care providers. Barriers to communication that hinder the provision of interprofessional care should be removed.
- Once finalized, the Health Quality Ontario/Health Links care coordination tool should be adopted by all primary care providers, home care service providers, and home-based therapy/services (eg, Community Care Access Centres) and their contracted providers to facilitate greater coordination with community health services.
- All discharge care should take into account a patient's home environment.
- All health care providers should work to integrate care to drive performance, improve communication, and ensure individualized patient care plans are followed.
- The challenge of human resources shortages on the implementation of community-based care in some regions of the province should be considered. In regions where human resources are lacking, the LHIN should be involved to grow capacity.
- The impact of this QBP should be evaluated on a regular basis and updated where required.
- Physicians and health care leaders should be engaged early in the development of funding programs and quality-based measures to promote understanding and acceptance and ensure successful uptake of the QBP recommendations.
- Health care leaders, patients, and caregivers should be involved in the development of implementation materials.
- Primary care providers should have adequate decision support to respond to the increasing demand for data.
- Once developed, implementation of this QBP should use evidence-based Knowledge Translation and Exchange (KTE) strategies to increase the uptake of recommendations.
- Once they are completed, OHTAC recommendations on end-of-life care and planning should be implemented.
- CIHI Stroke Special Projects (340, 640 and 740) are collected in the Discharge Abstract Database and 340 is also collected in NACRS and all elements within each project need to be reported. The elements include: stroke symptom onset, neuroimaging, tPA, stroke unit admission, dysphagia screening, antithrombotics, referral to secondary prevention, AlphaFIM and Telestroke initiated.
- The LHIN metric measuring referral to home care service provision should be removed; for some stroke patients, the period between referral to home care services (such as Community Care Access Centres) and discharge from hospital may be up to 7 weeks from the time of discharge to home care involvement by health care professionals.
- To gain efficiencies and access to multiple skilled services, a centralized model of care is preferred. Where a patient is unable to attend a centralized service or the service does not meet a patient's needs, rehabilitation should be provided by a coordinated and organized interprofessional team specialized in stroke care.

- Recommendations in this QBP cover the first 60 days postdischarge. However, many stroke patients require ongoing care beyond the first 60 days, including complex continuing care or long-term care.

# Expert Advisory Panel Membership

Members with an \* actively participated in the phase 3 update of the acute episode of care and integration with the postacute episode-of-care process.

## Health Quality Ontario's Stroke Acute Episode of Care Advisory Panel

Name	Affiliation(s)	Appointment(s)
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<b>Neurology</b>		
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Dr. Richard Swartz	Sunnybrook Health Sciences Centre; University of Toronto	Director, University of Toronto Stroke Program; Medical Director, NE-GTA Regional Stroke Program; Associate Professor, Division of Neurology, Department of Medicine
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Dr. R. Loch MacDonald	St. Michael's Hospital	Keenan Endowed Chair in Surgery; Head, Division of Neurosurgery; Professor of Surgery, University of Toronto
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Name	Affiliation(s)	Appointment(s)
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<b>Occupational Therapy</b>		
Rebecca Fleck*	Hamilton Health Sciences Centre	Regional Stroke Educator and Research Coordinator
<b>Speech/Language Pathology</b>		
Holly Sloan	Trillium Health Partners	Speech-Language Pathologist
<b>Social Work</b>		
Kathleen Lee	Health Sciences North	Social Worker
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Dr. Ruth Hall*	Ontario Stroke Network	OSN Evaluation Lead; Adjunct Scientist, Institute for Clinical Evaluative Sciences
Linda Kelloway*	Ontario Stroke Network	Best Practices Leader
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Linda Welham	Southlake Regional Health Centre	Professional Resource, Case Costing and decision Support
Lori Marshall	Thunder Bay Regional Health Sciences Centre	Executive Vice President, Strategy, Performance and Aboriginal Health
<b>Patient Representation</b>		
Daniel Brouillard	Kingston Heart Clinic	Internist, Stroke Survivor
<b>Ministry of Health and Long-Term Care</b>		
Peter Biasucci*	Ministry of Health and Long-Term Care	Manager, Acute and Rehabilitative Care Unit, Implementation Branch, Health System Accountability and Performance Division
Thomas Smith	Ministry of Health and Long-Term Care	Acting Program Manager, Provincial Programs Branch

# Health Quality Ontario's Stroke Postacute Episode of Care Advisory Panel

Name	Affiliation(s)	Appointment(s)
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Karyn Lumsden	Central West Community Care Access Centre (CCAC)	Vice President of Client Services
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<b>Physical Medicine and Rehabilitation</b>		
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<b>Family Medicine</b>		
Dr. Adam Steacie	Ontario Medical Association	Board Member
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Armi Armesto	Sunnybrook Health Sciences Centre	Clinical Nurse Specialist
Karen Sutherland	St. Joseph's Health Care London Parkwood Hospital	Service Lead, Specialized Community Stroke Rehabilitation Team
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Jim Lumsden	Champlain Regional Stroke Network, The Ottawa Hospital	Director

<b>Name</b>	<b>Affiliation(s)</b>	<b>Appointment(s)</b>
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Mathew Meyer*	Ontario Stroke Network (OSN)	Project Coordinator
Joan Southam	CBI Health Group Home Health	Senior Manager and Project Specialist
<b>Patient Representation</b>		
Daniel Brouillard	Kingston Heart Clinic	Internist, Stroke Survivor
Nicole Martyn-Capobianco	University of Guelph-Humber	Program Head of Human Services
Trixie Williams	Central East LHIN	Lead, Vascular Health

# OSN Endovascular Treatment Implementation Work Group Care Advisory Panel

Co-Chairs: Dr Grant Stotts and Dr Timo Krings	
Members	
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Dr Al Jin	Stroke Neurologist, Regional Medical Director, SEO
Caterina Kmill	Regional Program Director, NWO
Dr Timo Krings	Neurointerventionalist, UHN, Co-Chair
Beth Linkewich	Regional Program Director, N&EGTA
Dr Cheemun Lum	Neurointerventionalist, The Ottawa Hospital
Dr Jennifer Mandzia	Stroke Neurologist, Regional Medical Director, SWO
Rhonda McNicoll-Whiteman	Stroke Best Practice Clinical Nurse Specialist, Hamilton Health Sciences
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Dr Laurie Morrison	ER Physician, Sunnybrook Health Sciences Centre
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Dr Jason Prpic	MoHLTC EHS Branch MAC Chair
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Dr Grant Stotts	Stroke Neurologist, Regional Medical Director, Champlain, Co-Chair
Denise St Louis	District Stroke Coordinator, Windsor Essex
Dr Rick Swartz	Stroke Neurologist, Regional Medical Director, N&EGTA
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Jacqueline Willems	Regional Program Director, SE Toronto
Dr Victor Yang	Neurosurgeon, Sunnybrook Health Sciences Centre
Linda Kelloway	Best Practices Leader, Ontario Stroke Network
Ad Hoc	ORNGE, HQO OHTAC, CritiCall Ontario, Provincial Neurosurgery Ontario, Ontario Association of Paramedic Chiefs

# Appendix A: Ontario Endovascular Treatment Centre Criteria

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## Background

An Ontario hospital must meet the following criteria to be designated as a Stroke Endovascular Treating Centre. There are two components of criteria; required and additional considerations. Required criteria outline elements that must be in place in order to be designated a Stroke Endovascular Treating Centre eligible for interim funding. Additional considerations criteria outline elements that are strongly recommended to be considered for stroke endovascular treatment planning and implementation.

## Required

- A designated Stroke Endovascular Team available 24 hours a day, seven days a week The team must include a stroke neurologist and a trained neurointerventionalist ( see below for training requirements)
- Stroke imaging on-site with 24 hour access, seven days a week, including computed tomography (CT) scanner ( i.e. 3<sup>rd</sup> generation or higher helical scanner) with programming for CT angiography (CTA) ( multiphase or dynamic CTA); CT perfusion imaging can also be used if available on-site<sup>3</sup>
- Capability and experience in administration of intravenous tissue Plasminogen Activator (tPA)<sup>4</sup>
- Neurosurgery support and neurocritical care services ( NeuroICU/Stepdown Unit) available
- Neurointerventionalist training and experience must include the following<sup>5</sup>:
  - Baseline training and qualifications:
    - Residency training ( in radiology, neurology or neurosurgery) including documented training under the supervision of a board certified neuroradiologist, neurologist or neurosurgeon in the diagnosis and management of acute stroke, the interpretation of cerebral arteriography and neuroimaging with subsequent board eligibility or certification **or**
    - Those physicians who did not receive the training during residency noted in the bullet above require an additional period ( at least one year) of training in clinical neurosciences and neuroimaging, focusing on the diagnosis and management of acute stroke, the interpretation of cerebral arteriography and neuroimaging prior to their fellowship in neuroendovascular interventions

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<sup>3</sup>Casaubon LK, Boulanger JM, on behalf of the Hyperacute and Acute Stroke Writing Group. *Hyperacute Stroke Care Module 2015*. In Lindsay MP, Gubitz G, Bayley M, and Smith EE (Editors) on behalf of the Canadian Stroke Best Practices and Advisory Committee. *Canadian Stroke Best Practice Recommendations*, 2015; Ottawa, Ontario Canada: Heart and Stroke Foundation.

<sup>4</sup> Casaubon LK, Boulanger JM, on behalf of the Hyperacute and Acute Stroke Writing Group. *Hyperacute Stroke Care Module 2015*. In Lindsay MP, Gubitz G, Bayley M, and Smith EE (Editors) on behalf of the Canadian Stroke Best Practices and Advisory Committee. *Canadian Stroke Best Practice Recommendations*, 2015; Ottawa, Ontario Canada: Heart and Stroke Foundation

<sup>5</sup>Consensus Statement. (2016). *Training Guidelines for Endovascular Ischemic Stroke Intervention: An International Multi-Society Consensus Document*. *American Journal of Neuroradiology* February 18 2016

- Post residency training: minimum one year dedicated training<sup>6</sup> in Interventional Neuroradiology (also termed Endovascular Neurosurgery or Interventional Neurology) under the supervision of a full-time Neurointerventionalist (with neuroradiology, neurology or neurosurgical training background)
- Ability for physician(s) to maintain qualifications as follows:
  - A minimum of 16 hours of stroke specific education every 2 years
  - Participation in ongoing quality assurance and improvement program
  - A minimum of > twenty cases/year/centre<sup>7</sup>
  - A minimum of > twenty supraortic catheterizations/year/physician
- For post procedure care: Able to admit to a designated critical care/Step down and/or Stroke Unit with monitoring capabilities and protocols in place that follow current evidence based-stroke best practice recommendations<sup>8</sup>
- For ongoing acute care admission: Able to admit to a stroke unit that meets the Ontario definition:
  - A geographical unit with identifiable co-located beds
  - Occupied by stroke patients 75% of the time
  - Dedicated interprofessional team<sup>9</sup>
- Protocols in place that follow current evidence based-stroke best practice recommendations for hyperacute treatment, acute stroke management and access to early rehabilitation<sup>10</sup>
- Established process for collection and analysis of process and outcome data

### Additional Considerations

- Access to a biplane angiography suite<sup>11</sup>
- Use of retrievable stents are recommended as first choice endovascular device
  - Other devices such as thrombus aspiration devices may be used based on local protocols and expertise
- CT to recanalization time of less than 90 minutes and door to recanalization time of less than 120 minutes.

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<sup>6</sup> Specific training for intra-arterial therapy for acute ischemic stroke should be performed including obtaining appropriate access even in challenging anatomy, microcatheter navigation in the cerebral circulation, knowledge and training of the use of stroke specific devices and complication avoidance and management

<sup>7</sup> Recommendation from the EVT Working Group in alignment with Training Guidelines

<sup>8</sup> Casaubon LK, Boulanger JM, on behalf of the Hyperacute and Acute Stroke Writing Group. *Hyperacute Stroke Care Module 2015*. In Lindsay MP, Gubitz G, Bayley M, and Smith EE (Editors) on behalf of the Canadian Stroke Best Practices and Advisory Committee. *Canadian Stroke Best Practice Recommendations*, 2015; Ottawa, Ontario Canada: Heart and Stroke Foundation.

<sup>9</sup> Interprofessional team with expertise in stroke care including, at a minimum, nursing, physiotherapy, occupational therapy and speech-language pathology.”

<sup>10</sup> Casaubon LK, Boulanger JM, on behalf of the Hyperacute and Acute Stroke Writing Group. *Hyperacute Stroke Care Module 2015*. In Lindsay MP, Gubitz G, Bayley M, and Smith EE (Editors) on behalf of the Canadian Stroke Best Practices and Advisory Committee. *Canadian Stroke Best Practice Recommendations*, 2015; Ottawa, Ontario Canada: Heart and Stroke Foundation.

<sup>11</sup> Recommendation from the EVT Working Group

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